

SPECIAL ISSUE CONTAINING REPORTS OF THE DALLAS MEETING OF THE
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
AND ASSOCIATED SOCIETIES

SCIENCE

FEB 9 1942

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This standard work supplies diagnostic descriptions and analytical keys. By Henry Sherring Pratt, Ph.D., Haverford College. 184 Illus., 416 Pages, \$6.00 (1935)

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SCIENCE

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THE ONE HUNDRED AND TENTH MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCE- MENT OF SCIENCE AND AFFILIATED AND ASSOCIATED SOCIETIES

Edited by Dr. F. R. MOULTON

PERMANENT SECRETARY

FROM December 29, 1941, to January 3, 1942, the American Association for the Advancement of Science held its annual meeting in Dallas, Texas. When the meeting was originally planned the officers of the association looked forward with pleasure to going to Texas, but their happy anticipations were clouded by the turn of international affairs early in December. Their misgivings, however, were not well founded, for the meeting surpassed all expectations. The programs of the association and its affiliated societies

included 1,436 addresses and papers which were presented at 193 different sessions. About 4,000 persons attended the scientific sessions, of whom 1,851 registered and received the general program of the meeting.

In 1931-1932 the association held its annual meeting in New Orleans, a much larger city than Dallas and one nearer the great centers of population. At the New Orleans meeting a decade ago and in time of peace the registration was 1,447, less than the registra-

tion at Dallas by 404, and the number of addresses and papers presented was 1,263, or 173 fewer than were presented at Dallas. This favorable comparison is due in part to the present vigor of the association and its affiliated societies and in part to the enthusiastic support of the Dallas meeting by the citizens of Texas, which was expressed in the excellent local arrangements and the exceptionally large attendance at the general addresses open to the public.

REGISTRATION

The registration for the meeting at Dallas by states and foreign countries was as follows: Alabama, 15; Arizona, 14; Arkansas, 23; California, 68; Colorado, 29; Connecticut, 17; District of Columbia, 30; Florida, 7; Georgia, 14; Hawaii, 1; Illinois, 79; Indiana, 44; Iowa, 60; Kansas, 51; Kentucky, 10; Louisiana, 84; Maine, 1; Maryland, 14; Massachusetts, 17; Michigan, 36; Minnesota, 34; Mississippi, 17; Missouri, 60; Montana, 3; Nebraska, 28; Nevada, 1; New Hampshire, 3; New Jersey, 14; New Mexico, 33; New York, 67; North Carolina, 17; North Dakota, 5; Ohio, 58; Oklahoma, 126; Oregon, 4; Pennsylvania, 29; Rhode Island, 4; South Carolina, 9; South Dakota, 5; Tennessee, 21; Texas (Dallas, 134), 621; Utah, 3; Vermont, 1; Virginia, 18; Washington, 4; West Virginia, 5; Wisconsin, 32; Wyoming, 6; foreign countries, 9 (Argentina, 1; Brazil, 2; Canada, 6); a total of 1,851.

ARTHUR H. COMPTON, PRESIDENT-ELECT

Dr. Arthur H. Compton, Charles H. Swift Distinguished Service Professor of Physics in The University of Chicago and Dean of the Division of Physical Science, was unanimously elected president of the association by the council at its meeting held on Dec. 31, 1941. In electing Dr. Compton the council agreed with the general membership of the association which favored him for president in the preference ballot cast in October and November.

It is unnecessary to list the honors Dr. Compton has received, for they are widely known in a general way but are too numerous to be remembered by any one, even by himself. He has been honored for the profound researches he has carried out in the quiet and solitude of his laboratory, for his scientific statesmanship (if the word may be borrowed for use in this connection) in organizing and carrying out worldwide investigations of the reception and properties of cosmic rays, and for the influence he has had on education. In choosing as its president a man so highly honored in foreign countries, as well as in his own, the association adds another illustrious name to the roll of its presidents.

Dr. Compton is a member of a family that has become famous in one generation, his brother, Dr. Karl

T. Compton, president of the Massachusetts Institute of Technology, having been president of the association in 1935, and his brother, Dr. Wilson Compton, having been a member of the finance committee of the association from 1933 to 1941. Dr. Arthur H. Compton was born in Wooster, Ohio, 49 years ago, son of a college professor of philosophy and of a mother noted for her intelligence, ability and character. He was graduated from Wooster College in 1913, took his Ph.D. degree at Princeton University in 1916, and he has received honorary degrees from several universities. He has been on the faculty of Wooster College, Princeton University, the University of Minnesota, Washington University, and finally in the department of physics of The University of Chicago since 1923. Dr. Compton has had in addition the broadening experiences of being a research physicist of the Westinghouse Lamp Company in 1917-1919, a national research fellow at Cambridge, England, in 1919-1920 and special lecturer at several foreign universities.

Those who do not know Dr. Compton personally naturally wonder what sort of man he is as a human being. Contrary to the cartoonist's conception of a scientist, he was a football player in college and has kept his robust physique, he is not absent-minded or a dreamer but an excellent companion with a great variety of interests, and as a member of society he is a model of stability and integrity. Nor is he lacking in appreciation of the fine arts or of the aspirations that move us in quiet hours. He is, in fact, one of the most sincere supporters among scientists of the value of religion for humanity. Of such a sort is the man whom the association has chosen as its leader at the time of its greatest membership and of its greatest opportunities for service to science and society.

THE ASSOCIATION PRIZE AWARD

A generous friend of the association has provided a Thousand Dollar Prize to be awarded at each annual meeting for a paper of high importance presented before a scientific session. Since the relative importance of scientific work in different fields can not be determined, there can be no "best paper" at a meeting of the association. There can be and are many papers of high importance, a fact that makes the work of the prize committee difficult.

The nineteenth Thousand Dollar Prize was unanimously awarded at the meeting in Dallas to Drs. Dugald E. S. Brown and Douglas A. Marsland, of New York University, and Dr. Frank H. Johnson, of Princeton University, for two joint papers, referring to two aspects of the same broad problem, the titles of which are given in the following report of the prize committee. The report of the prize committee, consisting of Frank E. E. Germann (chemist), chair-

man, John A. McGeoch (psychologist), Hugh D. Miser (geologist), Theophilus S. Painter (zoologist) and Malcolm H. Soule (bacteriologist) was as follows:

The Committee on the Thousand Dollar Prize Award has been greatly impressed by the large number of papers presenting the results of pure and applied research which have been read at the 110th meeting of the American Association for the Advancement of Science, held in Dallas.

We unanimously vote to award the Thousand Dollar Prize for the two closely related papers presented as one:

(1) "The Reversible Denaturation of Enzymes as a Determining Factor in the Reaction of Biological Systems to Temperature and Pressure." (2) "The Mechanism of Temperature and Hydrostatic Pressure Reversal of Narcosis in Luminous Bacteria," by Drs. Dugald E. S. Brown and Douglas A. Marsland, of New York University, and Frank H. Johnson, of Princeton University.

In these papers an interpretation for the reversible biological effects of pressure is presented and the quantitative evidence seems to be fully conclusive and is directly referable to basic principles of thermodynamics.

In solving the riddle of pressure, evidence has been found for a new general understanding of temperature relations in biological processes. A new concept, also supported by clear-cut evidence, is introduced with regard to the mechanism of narcosis.

Thus a common denominator appears to have been found for three fundamental factors in biological processes—pressure, temperature and narcosis—wherein diverse effects can now be related to the same fundamental mechanism, itself in accord with familiar laws of physical chemistry.

Dr. Brown was born in St. Thomas, Ontario, in 1901, and took his college work at the University of Michigan and received the Ph.D. degree from Cornell University. Dr. Marsland was born in Brooklyn in 1899 and received the B.S. and Ph.D. degrees from New York University and the M.S. degree from Columbia University. Dr. Johnson was born in Raleigh, N. C., in 1908 and received the A.B. and Ph.D. degrees from Princeton University and the A.M. degree from Duke University.

RESOLUTION OF APPRECIATION

(Unanimously passed by the Council Dec. 31, 1941)

"For the first time in the history of the A.A.A.S. the great state of Texas has been its host for an annual meeting. Texas was admitted as a state at about the same time the Association was organized, the state having been taken into the Union in 1845 and the A.A.A.S. having been organized in 1848. Both Texas and the Association have surpassed the highest expectations of their founders. Texas is an empire, not only in the extent and variety of its area, but in its natural resources, its agriculture, industry, commerce and wealth; and now in its education, its culture,

its ambitions and in all the finer aspects of civilization. It has been a distinct pleasure for this Association, one of the greatest scientific associations of the world, to hold its 110th meeting in one of the several outstanding cities of this state.

"Now that the meeting has exceeded all expectations in attendance, quality of papers and local interest, the Council of the Association, at its final session, held in Dallas on this, the last day of the year 1941, records its deep appreciation for the efficient services rendered by the Dallas Local Committee, organized under the chairmanship of Dr. W. E. Wrather, and for the unflinching support of the Southern Methodist University, and of all other cultural and educational institutions of Texas, for the hearty and effective cooperation of the many Texas scientific organizations, for the generous, abundant and intelligent support of the local press, for the facilities provided by local institutions and organizations, and most of all, for the cordial welcome extended by Texas citizens in general.

"In this environment and supported by Southwestern hospitality, the scientists for a brief period have turned aside from the grievous turmoils of the world and have concerned themselves with matters of great importance in the long run of human interest and welfare.

"For the generous hospitality bestowed and for efficient assistance received in holding a great meeting during critical times, the American Association for the Advancement of Science here records its grateful thanks to the citizens of Texas."

THE PRESS

(From report by Sidney Negus, director)

Of the 1,423 titles of addresses and papers listed in the program of the meeting, 382 were received in full or in abstract form in time to make them available for the use of the Press in Dallas. With their usual acumen the science writers discovered what papers were regarded as important by the scientists themselves, as well as those that lent themselves readily to interesting news stories. The members of the National Association of Science Writers sent out daily thousands of words about the meeting that were used widely by leading daily papers throughout the United States; and representatives of Texas papers made the meetings one of the principal news items of the week. This happened at a time when the papers were crowded with war news from all over the world.

THE ACADEMY CONFERENCE

(From report by V. Earl Light, secretary)

The fifteenth annual Academy Conference was held on the afternoon of December 29 with 21 representatives of affiliated academies, 2 members of the ex-

executive committee of the association and 4 visitors in attendance. The formal program consisted of "A Résumé of A.A.A.S. Research Grants" made by affiliated academies, by E. C. Faust, of the New Orleans Academy, and a paper on "The Organization of a Collegiate Division of the Texas Academy of Science," by J. C. Godbey. Dr. Faust brought out (a) that in making grants for research the academy as a rule adds very little to the funds supplied by the association; (b) that there is little evidence that the research projects reach the publication stage except as abstracts in academy transactions; and (c) with few exceptions, the secretaries of the academies have difficulties in obtaining progress reports from grantees. It was recommended that the academies consider restricting grants to persons who would furnish annual progress reports, that the secretaries and grants committees of the academies cooperate in keeping duplicate and continuing files of all grants made since 1935, and the reports clear through the office of the permanent secretary of the association.

Dr. Godbey reported any science club or society in any college or university of Texas having 10 or more student members, at least 5 of whom are members of the Texas Academy of Science, is eligible for membership in the Collegiate Division of the Academy and is designated as a chapter. Each chapter is entitled to an official delegate for each 10 members to the annual meeting which is held concurrently with the annual meeting of the academy. Each student member of a chapter who is a member of the academy pays an annual membership fee of \$1 to the academy.

At the close of the complimentary dinner provided by the association, E. C. L. Miller resigned as chairman of the Committee on Junior Academy Relationships. A committee, consisting of S. W. Bilsing, G. W. Prescott, F. R. Moulton and Otis W. Caldwell, was authorized to form a committee to study junior academy problems.

THE SECRETARIES CONFERENCE

(From report by Ernest Carroll Faust, secretary)

The annual Secretaries Conference was held Dec. 31, following a complimentary dinner by the A.A.A.S. to the secretaries of the sections and of the affiliated and associated societies participating in the meeting. Twenty-eight persons were in attendance, including 6 members of the Executive Committee, the secretary of the Southwestern Division, the director of press service, the secretaries of 12 sections, the secretaries of 6 affiliated societies and 2 guests. Dr. Otis W. Caldwell was chairman of the conference.

First on the program was a report by Dr. B. E. Livingston, of the committee on revision of the constitution, of which he is chairman. He presented the

proposed constitution with annotations explaining all important changes from the present constitution. The discussions were spirited and relevant, for no one appreciates better than the secretaries of the sections and of the affiliated societies the administrative problems of the association.

The second part of the program consisted of a symposium on "Science and Human Needs," the first contribution to which was a paper by Dr. M. F. Morgan, secretary of the Section on Agriculture, on "Social and Economic Aspects of Scientific Agriculture in Relation to Human Needs." Among the many interesting things he mentioned was the fact that only 22-30 per cent. of the students in colleges of agriculture go into farming. He also commented on the transition that is rapidly going on in agriculture from individualistic enterprises to a coordinated and even regimented industry. The second participant in this symposium was Dr. Bruce L. Melvin, *secretary pro tem.* of the Section on Social and Economic Sciences, who presented a paper on "The Social Sciences and Human Needs." Both of these papers gave rise to lively discussions.

GENERAL SESSIONS

With the growth of the association and the increase in the number of its affiliated societies its scientific sessions naturally become more numerous and more specialized. Since, at the Dallas meeting, there were 193 different sessions for the delivery of addresses or the presentation of papers, most of which were held in three days, it follows that during a large part of the time many sessions were being held simultaneously. For example, on Tuesday morning 36 sessions were held, requiring of course 36 meeting rooms fully equipped with all the facilities required for holding large scientific meetings.

There were, however, a number of general sessions in which distinguished scholars presented surveys and integrations of broad fields of science and of science in its relations to the problems of living. In these sessions scientists with widely different special interests and the general public met together with the common purpose of broadening their understanding of the physical and biological universes about us and within us.

In conformity with custom, the first general session held on Monday evening was for the presentation of the retiring president's address. After an address of welcome by Dr. Umphrey Lee, president of Southern Methodist University, on behalf of the citizens of Dallas and of Texas, Dr. Irving Langmuir, president of the association, presented Dr. Albert F. Blakeslee, retiring president of the association, who delivered an address on "Individuality and Science." The audi-

once listened to the address with rapt attention and gave clear evidence of their approval at its close. It was published in full in the Jan. 2 issue of SCIENCE.

On Tuesday evening the Society of the Sigma Xi and the association presented the twentieth annual lecture under their joint sponsorship. The lecturer was Dr. Edwin P. Hubble, astronomer of the Mt. Wilson Observatory, who delivered an illustrated address on "The Expanding Universe Theory." Dr. Hubble himself laid the foundation for the theory he discussed by his discovery of the fact that the more distant an exterior galaxy of stars the more the spectral lines of its light are displaced toward the red end of the spectrum. These results were interpreted as proving that the hundred million known galaxies are rapidly receding from one another, which in turn gave rise to the "exploding universe" theory and the conclusion that the universe of galaxies originated about 2,000 million years ago. With admirable clarity Dr. Hubble marshalled the enormous observational evidence relating to the problem which he has secured in the course of years and showed that it is not consistent with the expanding universe theory. His paper will be published in the April *Sigma Xi Quarterly* and in the April number of *The Scientific Monthly*.

The Honor Society of Phi Kappa Phi joined with the association for the third time in sponsoring a lecture by a distinguished speaker at an annual meeting. Last year Dr. Edmund E. Day, president of Cornell University, delivered the address. This year, Dr. Homer P. Rainey, president of the University of Texas, was appropriately the speaker. He chose for his address the challenging subject, "Scholarship is Not Enough." How often when we are thoughtful do we come back to the fact that life is much more than lore!

For seven years the United Chapters of Phi Beta Kappa and the association have joined in sponsoring a lecture that is intended not only to integrate the sciences, natural and social, but to ignore the boundaries that too frequently exist between the sciences and the humanities. This year the address, with Dr. E. L. DeGolyer presiding, was delivered by Dean Christian Gauss, of Princeton University, on "Can We Educate for Democracy?"

STATISTICAL SUMMARY OF PROGRAMS

One of the most valuable features of the meetings of the association and of its affiliated societies is the numerous joint sessions that are held. These joint sessions, however, make it difficult to present a clear picture of the meeting as a whole, including the magnitudes of the programs in the different fields.

The following table is a statistical summary of all

the programs, except the general sessions, at which papers were presented. The programs are classified under the subjects covered by the different sections of the association. When a section or a society meets alone the facts respecting its program are clear. In case a section and a society or two societies in the same group meet jointly, the section or the society appearing first in the program is given first in the table and the program is not repeated with the other society appearing first.

When, however, two different sections, or a section and a society in a different section, or two societies in different sections hold a joint session, the program is repeated in both sections. For example, the Section on Geology and Geography (E) and the Section on Anthropology (H) held a joint session which is announced under each section for the obvious reason that to list it under one alone would leave an erroneous impression regarding the extent of the program of the other. For this reason the following summary contains a few duplications.

| SECTIONS AND SOCIETIES | SESSIONS | PAPERS |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------|
| <i>Mathematics</i> | | |
| Section A, Institute of Mathematical Statistics and Econometric Society | 2 | 15 |
| <i>Physics</i> | | |
| Section B and Am. Assoc. of Physics Teachers | 4 | 21 |
| American Meteorological Society | 4 | 16 |
| <i>Section on Chemistry (C)</i> | 4 | 31 |
| <i>Section on Astronomy (D)</i> | 5 | 14 |
| <i>Geology and Geography</i> | | |
| Section E, Geol. Soc. of Am., Texas Acad. of Sci., Dallas Petroleum Geologists and Ft. Worth Geol. Soc. | 2 | 19 |
| Section E, Geol. Soc. of Am. and Am. Geophysical Union | 1 | 8 |
| Section E, Geol. Soc. of Am. and Section on Anthropology | 1 | 10 |
| Section E, Geol. Soc. of Am. and Assoc. of Am. Geographers | 2 | 9 |
| Section E Exhibits | | |
| <i>Zoological Sciences</i> | | |
| Address of Vice President (Zoologists' Dinner) | 1 | 1 |
| Am. Soc. of Zoologists | 8 | 89 |
| Am. Soc. of Zool. (motion pictures) | | 8 |
| Am. Soc. of Zool. (demonstrations) | 7 | 24 |
| Am. Soc. of Zool. (papers by title) | | 138 |
| Am. Soc. of Zool., Bot. Soc. of Am. and Ecological Soc. of Am. | 2 | 8 |
| Am. Soc. of Zool., Am. Soc. of Naturalists, Bot. Soc. of Am. and Genetics Soc. of Am. | 1 | 4 |
| Am. Soc. of Parasitologists | 5 | 58 |
| Am. Soc. of Parasitologists (demonstrations) | 1 | 13 |
| Am. Soc. of Parasitologists (papers by title) | | 30 |
| <i>Botanical Sciences</i> | | |
| Section G, Bot. Soc. of Am., Am. Phytopathological Soc., Am. Soc. of Plant Physiologists, Mycological Soc. of Am., Am. Fern Soc., Sullivant Moss Soc., and Am. Soc. of Plant Taxonomists | 1 | 4 |
| Botanical Soc. of America | 9 | 78 |

| SECTIONS AND SOCIETIES | SESSIONS | PAPERS |
|-------------------------------------------------------------------------------------------------|----------|--------|
| Bot. Soc. of Am. and Am. Soc. of Plant Taxonomists | 4 | 25 |
| Bot. Soc. of Am., Genetics Soc. of Am., Ecological Soc. of Am. and Am. Soc. of Zoologists | 1 | 4 |
| Bot. Soc. of Am., Am. Soc. of Zool. and Ecological Soc. of Am. | 2 | 4 |
| Bot. Soc. of Am., Am. Soc. of Plant Physiol., and Am. Soc. for Horticultural Science | 1 | 6 |
| Address of retiring president of Bot. Soc. of Am. | 1 | 1 |
| Bot. Soc. of Am. and Am. Soc. of Plant Physiol. | 2 | 11 |
| Bot. Soc. of Am., Am. Soc. of Naturalists, Am. Soc. of Zool. and Genetics Soc. of Am. | 1 | 4 |
| American Phytopathological Society .. | 9 | 92 |
| Am. Phytopathological Soc. (demonstrations) | 1 | 20 |
| Am. Phytopathological Soc. and Potato Assoc. of Am. | 1 | 6 |
| Am. Phytopathological Soc. and Mycological Soc. Am. | 1 | 7 |
| Am. Soc. of Plant Physiologists | 6 | 48 |
| Mycological Society of America | 3 | 30 |
| Sullivant Moss Society | 2 | 10 |
| American Fern Society | 1 | 3 |
| <i>Zoological and Botanical Sciences</i> | | |
| Am. Soc. of Naturalists, presidential address | 1 | 1 |
| Am. Soc. of Naturalists, Am. Soc. of Zool., Bot. Soc. of Am., and Genetics Soc. of Am. | 1 | 4 |
| Ecological Society of America | 9 | 56 |
| Ecological Soc. of Am. and Limnological Soc. | 1 | 9 |
| Genetics Society of America | 3 | 28 |
| Genetics Soc. of Am. demonstrations .. | 1 | 24 |
| Genetics Society of Am. (papers by title) | | 23 |
| Limnological Soc. of America | 3 | 31 |
| Limnological Soc. of Am. (papers by title) | | 12 |
| National Assoc. of Biology Teachers .. | 2 | 11 |
| Phi Sigma Society | 2 | 15 |
| Beta Beta Beta Honorary Biological Soc. | 1 | 1 |
| <i>Section on Anthropology (H)</i> | 1 | 7 |
| Section H, Section E and Geol. Soc. of Am. | 1 | 10 |
| <i>Section on Psychology (I)</i> | 5 | 30 |
| Section I and Section on Education (Q) | 2 | 8 |
| <i>Section on Social and Economic Sciences (K)</i> | 3 | 11 |
| Section K and Texas Academy of Science | 1 | 3 |
| Section K and Bureau of Business Research, U. of Texas | 1 | 3 |
| Section K and National Resources Planning Board | 1 | 4 |
| National Social Science Honor Society, Pi Gamma Mu | 1 | 1 |
| <i>Section on Engineering (M)</i> | 3 | 7 |
| <i>Section on Medical Sciences (N)</i> | 5 | 33 |
| <i>Subsection on Dentistry</i> | 3 | 15 |
| <i>Subsection on Pharmacy</i> | 1 | 8 |
| <i>Agricultural Sciences</i> | | |
| Section on Agriculture (O) and Am. Soc. for Horticultural Science | 1 | 6 |
| Am. Soc. for Horticultural Science .. | 11 | 89 |
| Am. Soc. for Horticultural Science (round tables) | 2 | |
| Am. Soc. for Horticultural Science, papers read on demand | | 107 |

| | |
|------------------------------------------------------------------------------------|---|
| Am. Soc. for Horticultural Science and Potato Assoc. of Am. | 1 |
| Am. Soc. for Hort. Sci., Am. Soc. of Plant Physiologists and Bot. Soc. of Am. | 1 |
| Am. Soc. for Hort. Science and Am. Statistical Assoc. | 1 |
| Potato Assoc. of Am. | 2 |
| Potato Assoc. of Am. and Am. Phytopathological Soc. | 1 |
| <i>Section on Education (Q)</i> | 4 |
| Section Q and Section on Psychology (I) | 2 |

SECTION AND SOCIETY PROGRAMS

SECTION ON MATHEMATICS (A) AND AFFILIATED SOCIETIES

(From reports by Dunham Jackson and Dickson H. Leavens)

Section A (Dunham Jackson, *secretary*) held joint sessions with the Institute of Mathematical Statistics and the Econometric Society. At the session Monday afternoon A. B. Coble, retiring vice president for the section, delivered an address on "A Certain Set of Ten Points in Space," and S. S. Wilks presented a paper on "Representative Sampling." The program for the Tuesday sessions consisted of contributed papers on a wide variety of subjects, four of which were arranged by the Econometric Society. Presiding officers were G. T. Whyburn, chairman of Section A, H. J. Ettlinger and S. S. Wilks. The attendance included representatives of 18 states and the District of Columbia.

The Econometric Society (Dickson H. Leavens, *reporting*) held joint sessions with Section A and with the Institute of Mathematical Statistics on Monday afternoon, December 29, and Tuesday morning and afternoon, December 30. Four of the papers presented were arranged by the society. The Dallas meeting gave the econometricians contact with those using the same tools, while a meeting held in New York at the same time in connection with the Allied Social Science Association gave other members of the society contact with those working with the same subject-matter.

SECTION ON PHYSICS (B) AND AFFILIATED SOCIETIES
(From report by Frank C. McDonald)

The American Association of Physics Teachers held a regional meeting of 4 sessions on Monday and Tuesday in connection with Section B. On Monday morning 9 ten-minute contributed papers were presented, with A. L. Hughes presiding. Attendance, 71. At noon 49 of those attending had luncheon together. The first paper Monday afternoon was the address of the retiring vice president for Section B, A. L. Hughes, on "Applications of Electron Scattering."

This paper was followed by two papers on the electron microscope: "Stereo-Microscopy with the Electron Microscope," by V. K. Zworykin and J. Hillier, and "Electron Micrograph Studies of Insect Structures," by A. Glenn Richards, Jr., and Thomas F. Anderson. Attendance, 115. After the scheduled program on Monday afternoon about 50 persons remained for a conference on "Physics and the War," Dean H. L. Dodge leading the discussion.

The two sessions on Tuesday were for the presentation of 8 invited papers on "Applications of Physics to the Oil Industry," which dealt with the seismograph, gravimeter, electrical methods in prospecting, spectroscopy and hydrocarbon reactions. C. A. Heil and gave an interesting paper on "Geophysical Exploration and Its Part in National Defense." The last 2 papers were on "Training Physicists for Work in Geophysics," by Dr. J. C. Karcher and "Training Students for Work in the Petroleum Industry," by Professor E. A. Stephenson. Attendance at the Tuesday morning session, 57; at luncheon, 27; at Tuesday afternoon session, 58.

American Meteorological Society held 4 sessions on December 29-30 at which 14 papers were presented and a round-table discussion for employees of the U. S. Weather Bureau. On Tuesday evening the society held its annual dinner.

SECTION ON CHEMISTRY (C)

(From report by Neil E. Gordon and William M. Craig)

Section C presented a three-day program of three symposia on "Biochemistry," "Spectrographic Analysis" and "The Petroleum Industry," the attendance varying from 60 to 200. The papers consisted of reviews of recent developments in the respective fields. Since it is expected that the symposium on "Spectrographic Analysis" will be published by the association, its program will be given somewhat more fully than those of the others.

William M. Craig, who arranged the symposium on "Spectrographic Analysis," introduced it with a discussion of many of the general present-day applications of spectrography to problems of defense as well as those of everyday life, including detection of adulterations of foods, textiles, various metallic alloys and other commonly used products. Ralph A. Sawyer gave a description of the recent spectrographic installations made at the Ford River Rouge plant and at the Bethlehem Steel Company, and explained how analysis of steel can now be made in six minutes instead of hours as formerly. O. S. Duffendack gave an account of recent advances which have been made in research on the electrical sources of arcs or sparks used in making spectrographic determinations. Meth-

ods used in the adequate control of the purity of magnesium and its alloys were described by J. L. Saunderson, of the Dow Chemical Company, which has recently installed two large magnesium plants on the Texas coast. Important advances in research on non-metallic substances by spectrographic means were described by Maurice F. Hasler, of the Applied Research Laboratories. Phase rule studies made possible analyses of such materials as glasses, clays and other insoluble or inert and refractory materials. Recent advances in research with the mass spectrometer were described by John A. Hipple, Jr., of the Westinghouse Research Laboratories, who has recently perfected its use in quantitative analysis of gas mixtures. Henry R. Kreider presented a paper on recent advances in using infra-red absorption for the identification of hydrocarbons in petroleum products. Applications in prevention of cancer growth were also discussed. Two papers on spectrum analysis in astronomy, one by C. T. Elvey on "The Spectrum of the Night Sky" and the other by F. E. Roach on "The Chemical Analysis of Stars," were important and appropriate because a large part of modern theories of spectrographic analysis was first worked out in astronomical science. Marshall N. States explained the important characteristics of the photoelectric spectrophotometer and cited its many important uses, including its application in the quantitative determination of vitamin content of foods.

The symposium on "Biochemistry," consisting of 10 papers, covered a wide range of problems in the fields of nutrition, hormones, metabolism and effects of hormones, amino acids and vitamins upon transplantable tumors in rodents and inoperable tumors in man.

The symposium on the Petroleum Industry consisted of 9 papers, covering questions of origin, discovery, production, resources, chemistry and chemicals derived from petroleum. The participants in the symposium were leading chemists, geologists and industrial technologists.

SECTION ON ASTRONOMY (D)

(From report by C. C. Wylie)

Section D held 4 principal sessions, including a symposium on problems of teaching, an illustrated lecture on planets by E. C. Slipher and an illustrated lecture on the eclipse expedition to Brazil in 1940 by Paul A. McNally. The invited papers by E. P. Hubble, Paul Sollenberger and others were on the present state of knowledge in the field, rather than on specific research problems. Papers on teaching were contributed by S. L. Boothroyd, Robert L. Price and others. It was maintained that considerable demonstration equipment is necessary for effective teaching and that the cost of a well-equipped students' obser-

vatory should be no more than that of a well-equipped physics laboratory. Major G. B. Dany, director of navigation training at Kelly Field, Texas, spoke on the difficult problem of obtaining properly qualified teachers and students in air navigation and asked university men to work with the Army Air Corps toward its solution. Attendance, about 75.

In addition to the programs for the presentation of papers, there was an exhibit of photographs by O. E. Monnig, Frank M. Preucil and C. C. Wylie, text and reference books from several publishers, meteorites and tektites by O. E. Monnig, and demonstration equipment by J. D. Boon. A luncheon arranged by J. D. Boon, host, and O. E. Monnig was held in Virginia Hall of Southern Methodist University.

SECTION ON GEOLOGY AND GEOGRAPHY (E)

(From report by A. C. Swinnerton)

Section E held 6 half-day sessions, December 29-31, at which 41 papers, including the address of the retiring chairman, were presented. One half-day was devoted to general papers, and 4 symposia were arranged for the other sessions. Attendance at two sessions exceeded 100; probably 200 different individuals were present at the 6 sessions.

In the program of general papers notable contributions were made by Charles N. Gould in his intimate account of "Forty Years of Oklahoma Geology" and its influence on the development of the state, and by Hugh D. Miser in his retiring vice presidential address on the "Quartz Veins in the Ouachita Mountains of Arkansas and Oklahoma."

Work on outstanding unfinished and scarcely touched problems of southwestern geology, involving rocks and structures ranging from the Pre-cambrian to the Tertiary, was the theme of 9 papers presented Monday afternoon in a program arranged by a committee of which Charles L. Baker was chairman. On Tuesday morning Oscar E. Meinzer introduced the symposium of 8 papers on the "Relation of Geology to the Ground-Water Problems of the Southwest." A. N. Sayre was chairman of the committee which organized the symposium.

On Tuesday afternoon Section E joined with the Section on Anthropology (H) in a symposium on "Early Man," planned by W. M. Krogman, E. H. Sellards and Thorne Deuel. (Report of Section H.)

Wednesday was devoted to a symposium on "South-Western Geography," planned by Edwin J. Foscue, representative of the Association of American Geographers. Six major papers were presented, covering topics from the history of population to land use. At 3:30 the Section E audience reassembled under

the auspices of the Texas Geographic Society to hear an illustrated lecture by J. W. Hoover on "The Havasupai Indians of Arizona."

In all its programs Section E enjoyed the joint sponsorship of the Geological Society of America for its Monday sessions it was joined by the Texas Academy of Science, the Fort Worth Geological Society and the Dallas Petroleum Geologists; on Tuesday morning by the American Geophysical Union and on Wednesday by the Association of American Geographers. For the majority of the sessions Morris M. Leighton, chairman of the section, presided; other presiding officers were W. E. Wrather, C. N. Gould, E. J. Foscue and F. B. Kniffen.

One of the scientific exhibits arranged especially for Section E and the association was a remarkable display of geological, geophysical and paleontological contributions to the development of oil-field production, provided by the Houston Geological Society under the leadership of Paul Weaver. Another noteworthy exhibit was the newly published booklet on the geology of the vicinity of Dallas arranged by C. C. Albritton, Jr.

SECTION ON ZOOLOGICAL SCIENCES (F) AND AFFILIATED SOCIETIES

(From reports by L. V. Domm and O. R. McCoy)

The address of J. T. Patterson, vice president and chairman of the section and a former president of the society, on "Drosophila and Speciation," was read by T. S. Painter on Tuesday evening at the Zoological dinner.

The American Society of Zoologists (L. V. Domm, secretary) held its 39th annual meeting on Dec. 29-31, 1941, in conjunction with Section F and in association with several other biological societies. The meeting was noteworthy for the outstanding character of three symposia and the great variety of papers presented at the regular sessions.

The first symposium, under the leadership of B. E. Willier, was held on the opening morning. The thirty participants in it presented a critical review of "The Genetic Control of Embryonic Development." The small number of speakers permitted considerable discussion, a feature greatly appreciated by those in attendance. Attendance, about 250.

The second symposium, organized by J. T. Patterson, was held jointly with the Botanical, Ecological and Genetics Societies and dealt with the problem of "Isolating Mechanisms." The four participants presented a critical and well-coordinated account of this important and widely investigated problem. Estimated attendance, about 450 persons.

The third symposium, organized by H. H. Plough

a former vice president of the society, was on "Temperature and Evolution." It was held jointly with the Botanical and Ecological societies in two sessions on the second and third mornings of the meeting. There were four participants in each session who presented a well-coordinated and very valuable account of this general and greatly diversified subject. Approximately 300 persons were in attendance at each session.

Although the number of papers read in person at the 7 regular sessions was not as large as that of the last annual meeting, nor were there as many demonstrations, yet it was the consensus of opinion among those in attendance at both meetings that the Dallas meeting was exceptional in the variety of papers presented, as well as in the intense interest shown. In all, 101 papers were presented, and in addition, there were 24 demonstrations, a special feature of which was the cinema program, the attendance of which was estimated to have been about 300 persons. Estimated attendance at regular sessions, 500 different persons.

Officers for 1942 are: *President*, L. L. Woodruff; *vice president*, C. G. Hartman; *treasurer*, H. W. Beams; *member of Executive Committee*, R. E. Coker.

The American Society of Parasitologists (O. R. McCoy, *secretary*) held its annual meeting on December 29-31, with James E. Ackert presiding as president. The program contained 88 titles representing the fields of protozoology, helminthology and medical entomology.

The opening session on Monday was devoted to papers on the morphology and life histories of trematodes; in the afternoon veterinary parasitology was the chief topic of discussion. Papers on the immunology of parasitic infections featured the Tuesday morning session at the conclusion of which the presidential address on "Natural Resistance to Helminthic Infections" was delivered by James E. Ackert.

The annual parasitologists' luncheon, attended by 95 members and guests, was held Tuesday noon. In the afternoon 13 papers were presented at a demonstration program, during which tea was served. The concluding session on Wednesday was devoted mostly to papers on protozoology and included a promising report by Wendell D. Gingrich on the use of a new drug, acranil, in the treatment of malaria in birds.

The following officers of the society were elected: *President*, Henry E. Meleney; *vice president*, Rudolph W. Glaser; *secretary*, for two years, Oliver R. McCoy; *members of council*, for four years, Raymond M. Cable and Willard H. Wright, and for three years, Gilbert F. Otto; *members of the editorial board*, for four years, William W. Cort, Harold Kirby, Jr., and

Benjamin Schwartz. Professor Juan Bacigalupo, Buenos Aires, Argentina, was elected an honorary foreign member.

SECTION ON BOTANICAL SCIENCES (G) AND AFFILIATED SOCIETIES

(From reports by G. W. Martin, Paul R. Burkholder, E. M. Betts, D. B. Anderson, W. H. Camp, H. N. Andrews, Jr., J. A. Pinckard, Paul J. Kramer, J. N. Couch, Winona H. Welch and Joseph Ewan)

Section G met in joint session with the Botanical Society of America, American Phytopathological Society, American Society of Plant Physiologists, Mycological Society of America, American Fern Society, Sullivant Moss Society and the American Society of Plant Taxonomists, with an attendance of about 300, G. M. Smith, vice president for the section, acting as chairman. M. L. Fernald, retiring vice president, was unable to attend the meeting and his address, "Some Historical Aspects of Plant Taxonomy," was read by S. W. Geiser. This was followed by three invitation papers: R. W. Chaney on "Plant Distribution During the Past Fifty Million Years," W. H. Camp on "The Individual in Relation to Complex Populations in *Vaccinium*" and L. J. Stadler on "Some Experiments on Gene Mutation."

The Botanical Society of America (Paul R. Burkholder, *secretary*; Edwin M. Betts, Donald B. Anderson, W. H. Camp and Henry N. Andrews, Jr., *secretaries* of sections of the society) held sessions for presentation of papers under the auspices of its General, Physiological, Systematic and Paleobotanical Sections. The society joined with Section G and other societies affiliated with Section G in a varied program of invitation papers dealing with topics in the fields of taxonomy, paleobotany and genetics. Joint meetings were held with other groups for discussions on "Isolating Mechanisms," "Temperature and Evolution" and "Human Genetics." A symposium on "Teaching of Plant Physiology," with Dorothy Day presiding, and a "Forum on Teaching Plant Science," with W. F. Loehwing as leader, were held in cooperation with the American Society of Plant Physiologists. Both of these meetings were very stimulating and well attended.

The General Section held three sessions for the presentation of 35 papers. The papers at the opening session were devoted mainly to cytology and various phases of genetics. Papers read at the second session dealt almost entirely with physiology and ecology, including discussions of such subjects as "Traumatic Acid and Mitosis in *Ricinus communis*," "Physiological Studies on Mosses," "Frost Injury

Artificially Induced in Arizona Cypress" and "Development of Adventitious Roots in Stem Cuttings of *Tropaeolum majus*." At the final session the papers dealt with various aspects of plant anatomy, including "Notes on Growth and Differentiation in the Marsileaceae," "The Embryogeny of *Pseudolarix* and *Keteleeria*," "Cell Growth and Division in a Living Root Meristem" and "Embryo and Endosperm Formation in *Illicium floridanum*." Officers of the section for 1942: *Chairman*, E. B. Matzke, *secretary*, E. M. Betts.

The Physiological Section held two sessions for the presentation of 21 papers. The subject of growth in relation to auxins and environmental factors was prominent on the program, but a wide range of other topics, including water and mineral element absorption, respiration, photosynthesis, seed dormancy and germination, stomatal behavior and micro-analysis, also received attention.

The joint symposium on "Experimental Design and the Control and Measurement of Error in Physiological Investigations" was held with the American Society of Plant Physiologists and the American Society for Horticultural Science. A panel of members led the discussion on a question-and-answer basis with the audience also participating. This unusual program proved to be very successful and informative and was well received by an audience of about 100 members.

Officers for the section for 1942: *Chairman*, H. W. Popp; *secretary*, D. B. Anderson.

Of the four sessions of the Systematic Section, two were devoted to "The Origin and Development of the Floras of the Southwest: (1) The Analysis of a Desert Region; (2) The Edwards Plateau (Texas)—Ozark Mountains Transect." Papers were presented before the third session on such varied topics as Louisiana prairies, noteworthy plants from Minnesota and New Mexico, freshwater and marine algae, impurities in seed samples, species problems in *Quercus* and *Polygonatum*, and a general consideration of the mechanisms involved in the production of species. The final session was concerned mainly with phylogeny and distribution, including studies on wood anatomy in the Gruinales and Terebinthales and interspecific relationships of the North American species of *Cornus*, *Delphinium* and *Ranunculus*. It was evident throughout the sessions that American plant systematists are making increased use of experimental methods in their work, as well as bringing their interpretations into closer accord with sound phytogeographical principles based on paleontological evidences and the recent advances in geohistory.

Officers for the section for 1942: *Chairman*, C. A. Weatherby; *secretary*, W. H. Camp.

The Paleobotanical Section met for three half-day

sessions devoted to the presentation of technical papers and one half-day session for the demonstration of specimens. At the first session a number of papers were presented on the Pennsylvanian flora of the central states and on Pleistocene pollens and Devonian algae. At the second session N. W. Radforth reviewed the fossil history of the Schizaeaceae, and M. K. Elias discussed tertiary herbs and related paleobiologic problems. The third session was devoted entirely to investigations on the microfossils of Tertiary and Pennsylvanian coals. These three sessions were attended by approximately 40 persons.

Officers of the Botanical Society of America for 1942: *President*, M. L. Fernald, *vice president*, G. M. Smith; *secretary*, P. R. Burkholder; *treasurer*, Paul Weatherwax.

The American Phytopathological Society (J. A. Pinckard, reporting) held its 33rd annual meeting from Dec. 29, 1941–Jan. 1, 1942. Arranging its program in sections, it held 12 sessions in addition to several special conferences, demonstrations, round table discussions and dinners. In the 11 regular sessions 125 papers were scheduled, although only 107 papers were presented, 80 in regular sessions, 20 in special demonstrations, and 7 in the seed treatment conference. Continuing the society's long-standing policy of close cooperation with other branches of science, joint sessions with 6 other organizations were held. In addition, a series of informal conferences among the members of the society brought to light several proposals of immediate importance. By far the most important of these was a panel discussion on "Plant Pathology in Relation to National Defense and Post-War Readjustments," sponsored by the society's Extension Work and Relations Committee.

Several speakers at the conference pointed out how the impact of war upon the United States has demanded the redirection of research in certain branches of science. The urgent need for more and better foods, fibers and plant products for human and animal use was stressed, with significant illustrations drawn from the previous war. Experiences with outbreaks of ruinous epidemics among vital agricultural crops, which occurred in both Germany and the United States during the last war, prompted the members of the society to urge the council to immediate action, and for the second time in the history of the society a War Emergency Committee was appointed, consisting of J. G. Leach, Richard P. White and E. C. Stakman, to weld the regional plant disease work of the United States into a war-service action program and to represent the society in whatever capacity seemed appropriate for the furtherance of national defense and post-war readjustments.

Although the society was gravely concerned over the possible development of epidemics of plant diseases in a world at war, many excellent and timely reports of progress were heard. Results of a nationwide cooperative experiment carried out under the direction of the committee for coordination of research in cereal and vegetable seed treatments and the cotton seedling disease committee clearly showed how appropriate seed treatments can prevent substantial losses among certain crops.

The session on fruit diseases and fungicides included papers on a new disease, a new method for the control of raspberry anthracnose, and considerable information on the behavior of fungicides and their performance. At the session on tobacco and virus diseases, new information was presented on the role of potash in tobacco leafspot diseases and on the presence of a leafspot bacterium in the soil.

Demonstrations of the work of plant pathology in Texas and in Kansas were on exhibition in the Baker Hotel, while 20 exhibits of work by individual plant pathologists were located near the conference rooms of the society. Although the demonstration method of reporting progress is a relatively new undertaking of the society, the large attendance and interest shown indicated that demonstrations may become a permanent part of the program.

The Dallas meeting was attended by approximately 225 plant pathologists, 170 of whom enjoyed the annual Phytopathologists' dinner after which the new officers of the society for 1942 were announced: *President*, Lee M. Hutchins; *vice-president*, J. C. Walker; *councilor*, H. A. Rodenhiser. The council appointed C. C. Allison *secretary* to succeed R. S. Kirby. Membership in the society now stands at 1,112. New members elected, 75.

The meeting of the American Society of Plant Physiologists (Paul J. Kramer, *secretary*) was featured by an unusually large number of symposia and joint sessions. The Monday afternoon symposium on "Electrodynamics of Living Systems," presided over by E. J. Lund, brought together plant and animal physiologists for consideration of the significance of electrical potentials in plant and animal tissues. L. R. Blinks discussed electrical phenomena in large plant cells, Gordon Marsh the effects of radiation on bioelectric processes, and George H. Bishop the electrical potentials of nerve structures.

The Tuesday afternoon symposium with the American Society for Horticultural Science and the Physiological Section of the Botanical Society dealt with the proper planning of experiments. It represented an interesting departure from the usual program because, instead of a few formal papers, a round-table discus-

sion was held in which a panel of experts and members of the audience participated. An attempt was made to show in non-technical language the advantages of correctly designing experiments so that the results can be properly evaluated and the effects of certain undesirable factors can be eliminated. The program was arranged by V. R. Boswell, who led the discussion, and presided over by B. S. Meyer of the Physiological Section.

Teaching problems also received considerable attention, two joint symposia being held with the Botanical Society. The Tuesday evening symposium presided over by Dorothy Day dealt primarily with the teaching of plant physiology. Walter F. Loehwing presided over the Wednesday afternoon symposium which dealt with plant science teaching in general and especially the objectives of college botany courses.

The Monday morning program consisted of papers on bioelectric currents, responses to light and mineral nutrition of plants. The Tuesday morning general session included papers dealing with physiological techniques and plant chemistry. The Wednesday morning session included papers on dormancy in seeds and buds, a group of papers on photosynthesis and a group of 4 papers dealing with the absorption of water and the root pressure mechanism. Hilda F. Rosene described an apparatus to measure the absorption of water by single root hairs and Rosene, Eaton and van Overbeek discussed the root pressure mechanism. Apparently at least two and perhaps more mechanisms are involved, possibly including an osmotic mechanism and another inhibited by cyanide. The Wednesday afternoon session consisted of a group of papers dealing with various phases of the plant hormone problem.

At the annual plant physiology dinner on Monday evening, presided over by E. C. Miller, president of the society, the award of a Charles Reid Barnes Life Membership was made to Dr. Benjamin M. Duggar in recognition of his outstanding contributions to plant physiology. Dr. Philip R. White, of the Rockefeller Institute, Princeton, New Jersey, gave the Stephen Hales Prize address, "Vegetable Dynamicks and Plant Tissue Cultures," in which he discussed the techniques, problems and contributions of that important field of research. Attendance, nearly 100.

The Mycological Society of America (J. N. Couch, *secretary*) held three sessions at its 9th annual meeting. E. A. Bessey, in his presidential address, discussed the phylogeny of the fungi. One session was held on soil fungi. Several papers dealt with the relationship between environment and soil-borne fungal diseases. The possible control of harmful soil fungi by induced maximal bacterial populations was sketched as the most recent development. Another

session was devoted to fungous diseases of man and animals. *Coccidiomycosis* was found in rodents in Arizona and *Coccidioides immitis*, the causal organism, was found there in the soil. A new and more precise method of classifying the yeast parasites was presented. The spores of certain fungi, as *Caspergillus*, *Penicillium*, Rusts, Smuts, *Mucors*, etc., were found to be associated with certain types of "hay fever and asthma."

Additional work on the genetics of corn smut and *Glomerella* was described in a third session. Other significant papers threw new light on the nuclear behavior on the *Mucorales* and the relation between the nutritional requirements of *Allomyces* and its distribution. Greenhouse control of the mealy bug by a parasitic fungus was described in the joint session with the Phytopathological Society.

Officers for 1942: *President*, E. B. Mains; *vice president*, J. N. Couch; *secretary-treasurer*, G. B. Cummins.

The program of the Sullivan Moss Society (Winona H. Welch, *secretary*) concerned noteworthy mosses, liverworts and lichens in numerous states; the distribution of the Genus *Drepanocladus*; a homology in *Riella americana* as applied to the gemma and spore; gametophyte regeneration in *Physcomitrium turbinatum*; distribution of hepaticae in space and time; and a biography of Mary Parry Haines.

Officers for 1942: *President*, H. S. Conard; *vice president*, T. C. Frye; *secretary-treasurer*, Winona H. Welch.

The American Fern Society (Joseph Ewan, *reporting*) held its annual meeting on Jan. 1, 1942. The formal program consisted of a paper presented by the society's vice president, Joseph Ewan, on "Problems Suggested by Field Work with the Aquatic Pteridophyta of Colorado." It outlined the three types of problems, taxonomic, ecologic and phytogeographic, centering about the three genera *Marsilea*, *Equisetum* and *Isoetes*.

Apart from the formal meeting, two exhibits of ferns were placed on the tables for examination, one by Mr. and Mrs. G. M. Soxman of Texas species collected over the entire state; and the other of Colorado-Wyoming ferns provided by Joseph Ewan.

SOCIETIES RELATED TO BOTH THE SECTION ON ZOOLOGICAL SCIENCES (F) AND THE SECTION ON BOTANICAL SCIENCES (G)

(From reports by W. J. Hamilton, Jr., B. P. Kaufmann, J. E. Ackert and Paul S. Welch)

The American Society of Naturalists, in cooperation with the American Society of Zoologists, the Botanical Society of America and the Genetics Society of America, sponsored a symposium on "Human

Genetics," consisting of four papers by Laurence H. Snyder, Herluf H. Strandkov, Charles W. Cotterman and Lionel S. Penrose. This symposium will be published in the *American Naturalist*. At the Naturalists' dinner in the evening W. W. Cort, president of the society, delivered his presidential address on "Human Factors in Parasite Ecology."

The Ecological Society of America (W. J. Hamilton, Jr., *secretary*) held its meeting on December 29-31. Seventy-one papers were presented by members. On Monday afternoon a joint symposium on "Isolating Mechanisms" was held in combination with the Genetics Society of America, the American Society of Zoologists and the Botanical Society of America. The well-attended Ecologists' dinner was held Monday evening, at which the retiring president, Alfred E. Emerson, delivered an address on "Ecology, Evolution and Society."

On Tuesday morning, a joint symposium on "Temperature and Evolution" was held in conjunction with the American Society of Zoologists, at which papers were presented by H. H. Plough, G. Fankhouser, George P. Child and Emil Witschi. A joint session was held the same afternoon with the Limnological Society of America, at which A. S. Pearse presided. A field trip on Thursday morning was led by Willis G. Hewatt.

Officers for 1942: *President*, C. F. Korstian; *vice president*, Claude ZoBell; *secretary*, W. A. Dreyer.

The Genetics Society of America (B. P. Kaufmann, *secretary*) arranged a three-day program consisting of 6 sessions for the presentation of scientific papers and the annual business meeting and luncheon. Two mornings were devoted to the reading of 22 short papers, and a third to a program of 6 papers selected for more extended presentation. A demonstration program of 24 papers occupied one afternoon, and on the other afternoons members of the society participated with other societies in symposia on "Isolating Mechanisms" and "Human Genetics."

The invitation program featured an important study of G. W. Beadle and E. L. Tatum on Neurospora, showing that the production of certain substances such as pyroxydine and para-aminobenzoic acid may each be dependent on single gene differences. T. M. Sonneborn reported a high mutability rate of a gene determining mating types in *Paramecium aurelia* under the influence of temperature at the time that the macronuclei develop from the micronuclei. A. W. Pollister and A. E. Mirsky, in an analysis of biochemical differences attending cellular differentiation, described the preparation of a nucleohistone from mammalian organs and demonstrated its nuclear

origin. H. E. Warmke outlined a new method by which induced polyploidy may be used to determine the sex heterozygote in species of plants with morphologically undifferentiated sex chromosomes. H. Roman reported on translocations involving the "B" chromosomes of maize and their bearing on cytogenetic problems. J. W. Gowen presented evidence that differences in numbers of red and white cells are correlated with differences in resistance and susceptibility to typhoid among six strains of inbred mice. The annual luncheon was attended by 138 and the society voted to meet with the A.A.A.S. in New York next December.

Officers for 1942: *President*, E. W. Lindstrom; *vice president*, M. M. Rhoades; *secretary*, B. P. Kaufmann.

The American Microscopical Society (J. E. Ackert, *secretary*) met on December 29. At the executive committee luncheon, which was attended by three past presidents and most of the officers, reports were presented which showed the society to be in a thriving condition. During the year 540 pages of original material in biology and microscopy were published in the Quarterly Transactions with the aid of several grants from the Spencer-Tolles Fund, a society endowment amounting to over \$22,000.

The society voted to meet in 1942 in New York with the A.A.A.S. and named J. E. Ackert and A. M. Chickering as representatives on the council of the association.

Officers for 1942: *President*, John W. Scott; *first vice president*, G. W. Prescott; *second vice president*, R. P. Hall; *elective member to the executive committee* (three years), L. J. Thomas.

The Limnological Society of America (Paul S. Welch, *secretary-treasurer*) held its seventh annual meeting on December 29-31. The scientific program occupied 4 half-day sessions, one of which was a joint session with the Ecological Society of America. Papers in the first two half-day programs were concerned largely with general limnological matters, including pollution studies, lake sediments, chemical composition, plankton studies, reservoir lakes, lake types, acclimatization and certain limnological techniques. The third half-day program was devoted to papers concerned primarily with the limnological aspects of fisheries biology. In the joint meeting with the Ecological Society, the limnological contributions involved papers dealing with limnological excursions in Trans-Pecos Texas and Mexico, chemical and physical conditions in Philippine lakes, microfossils in lake sediments, limnological variables in a Colorado mountain stream and horizontal distribu-

tion of copepods inhabiting intertidal beaches. On Wednesday the society conducted a field trip to Eagle Mountain Lake and certain other points of limnological interest.

Officers for 1942: *President*, George L. Clarke; *vice president*, A. H. Wiebe; *secretary-treasurer*, Paul S. Welch; and *elective member of the executive committee*, G. E. Hutchinson.

The National Association of Biology Teachers held two sessions on Monday for the presentation of papers, and a dinner on Monday evening. Eleven papers were presented, of which three were illustrated lectures: "Texas Amphibians," by Ottys Sanders; "Reforestation and High School Biology," by Lida Rogers; and "Yellow Fever, Plague and Typhus—Smoldering Threats," by Asa C. Chandler. At the dinner the address by Walter F. Loehwing was on "Biology, Appraisal and Forecast."

Phi Sigma Society (A. I. Ortenburger, *secretary*) held two business meetings, one scientific meeting and one dinner. Twenty-eight chapters were represented by official delegates, and the total attendance was over 50. Fourteen papers were presented by members at the scientific meeting.

At the dinner, Dr. M. Ruiz Castaneda of the Hospital General, Departamento de Investigaciones Medicas, Mexico, D. F., gave an illustrated lecture on typhus fever. He discussed the discovery of a successful vaccine for typhus, effective not only for the endemic, but also for the epidemic, or European, type. This serum, which is made from the lungs of inoculated rodents, can be prepared by ordinary laboratory technicians on a large enough scale to protect entire armies. The great importance of Dr. Castaneda's work becomes apparent when the high typhus toll in the last war is recalled.

Officers elected are: *Chancellor*, Paul A. Warren; *treasurer*, E. H. Stewart.

SECTION ON ANTHROPOLOGY (H)

(From reports by T. N. Campbell and
A. C. Swinnerton)

Section H (W. M. Krogman, *secretary*; T. N. Campbell, *secretary pro tem.*) held one brief session on Monday afternoon, and on Tuesday afternoon met with the Section on Geology and Geography (A. C. Swinnerton, *secretary*) for a joint symposium on "Early Man."

At the Monday afternoon session 7 papers were read, 4 of them by title. G. W. McGinty described the Negro exodus from Louisiana during the years 1879-1881, and Early W. Count presented a paper on race identity as a growth phenomenon. At the

close of the session, W. Duncan Strong delivered his retiring vice presidential address on "Recent Archaeological Research on Latin America."

The joint symposium on "Early Man" was attended by approximately 100 persons. Seven papers were read, all demonstrating the urgent necessity of co-operation between archaeologists and geologists in attacking the problem of early man. In a paper on "Fossil Man and the Origin of Races," W. W. Howells presented the view that the primitive features of modern man indicate a separate line of cranial development and that *Homo sapiens* is as old as the other forms of man. The remainder of the papers dealt with various phases of the problem of early man in America. Robert M. Adams reported evidences of early human occupation in eastern Missouri; A. O. Bowden and Ivan A. Lopatin described a human skeleton from late Pleistocene deposits in southern California; and Frank C. Hibben summarized the results of recent archaeological reconnaissance in Alaska. Two significant Alaskan discoveries were reported by Hibben: Yuma points from the muck deposits in the vicinity of Fairbanks, and a stratified site on Cook Inlet which yielded points of a Folsom-like type. Edgar B. Howard gave a critical appraisal of the Folsom and Yuma problem and presented the results of recent excavation at a Yuma site near Eden, Wyoming. In two papers attention was given to the question of alluvial terrace deposits as chronological criteria. Glen L. Evans reported artifacts in the second terrace of the Rio Grande River in Southern Texas, and E. H. Sellards cited additional evidence from Texas River terraces to show how such terraces may be of use in determining the age of included archaeological remains. The latter paper evoked favorable discussion among the geologists present.

SECTION ON PSYCHOLOGY (I)

(From report by John A. McGeoch)

The sessions of the section were attended by psychologists from both coasts, as well as by those from the Middle West and South. The program consisted of 4 sessions of contributed papers, two symposia, one of them with the Section on Education, and a joint dinner with the Section on Education at which the retiring chairmen of the two sections delivered addresses.

The contributed papers covered a wide range of problems in the special fields of human and animal learning, perception, abnormal psychology and personality, mental testing and applied psychology and the psychological problems of national defense.

In the symposium on "Recent Advances in the Appraisal of Personality," organized by E. R. Hilgard, papers were presented by Pearl Bretnall, D. G.

Humm, F. A. Pattie and Dael Wolfe. Results from four different methods of appraising personality were reviewed—play and other expressive productions, paper and pencil tests, hypnosis and factorial analysis.

The joint symposium with the Section on Education, organized by A. W. Melton and H. H. Remmers, was devoted to the "Psychology of Learning and the Educative Process." The papers by three psychologists, E. R. Hilgard, N. L. Munn and John A. McGeoch, were characterized by complete agreement on the principles and data of psychology which are significant for education and on the practical inter-relatedness of the two fields. The unanimity displayed constituted an important demonstration of the systematic integration which has been developing in psychology. The papers from Education were by Harold F. Clark and Hyman Meltzer. The former described an extensive and socially important experiment on the influence of diet on learning. The latter uniquely surveyed the relations between mental hygiene and the learning process. These papers significantly illustrated the interrelation of education and psychology which was documented by the entire symposium.

On Tuesday evening Karl M. Dallenbach, vice president and chairman of the Section on Psychology, read a scholarly address on "The Temperature Senses: Their History and Present Status," in which he reviewed the development of research on these senses and summarized the results of recent research, with particular reference to the receptors involved. E. J. Ashbaugh, vice president and chairman of the Section on Education, presented the problems of learning to read, with illuminating reference to their relation to the construction of the language, in an address entitled "Education as Science and Art."

SECTION ON SOCIAL AND ECONOMIC SCIENCES (K) AND AFFILIATED SOCIETIES

Section K (Bruce L. Melvin, *secretary pro tem.*) held 6 sessions from Monday to Wednesday, inclusive, at which 23 papers were presented. The subject of the first session, held in cooperation with the Texas Academy of Science, under the chairmanship of J. Wheeler Barger, was "The Basic Economic Pattern." Papers were presented by C. A. Bonnen, T. G. Standing and Elmer H. Johnson. The subject of the second session, held in cooperation with the Bureau of Business Research of the University of Texas, under the chairmanship of A. B. Cox, was "The Industrial Pattern." Papers were presented at this session by Frank Rader, Elmer H. Johnson and George H. Anderson. The subject of the third session, Daniel Russell presiding, was "Population Patterns." E. D. Tetreau,

Joe E. Motheral, Homer L. Hitt and Kalvero Oberg were the contributors. George I. Sanchez presided at the fourth session, the subject of which was "Problems of Adjustment Among Spanish Americans." The speakers on this program were George I. Sanchez, M. C. Gonzales, H. T. Manuel and A. L. Campa. "Problems of Adjustment among the Indians of the Southwest" was the subject of the fifth session, at which Allen G. Harper presided. The papers were by W. V. Woehlke, E. R. Fryer and D'Arey McNickle. Allen G. Harper presided at the sixth session at which 4 papers were presented on "Planning to Meet Emerging Problems," one each on urban areas, agriculture, industry and the region.

The National Honor Social Science Society, Pi Gamma Mu (Leroy Allen, *secretary*), held its luncheon Wednesday noon under the chairmanship of S. Howard Patterson, *president*. J. L. Clark was toastmaster. The feature of the luncheon was an address by Bruce L. Melvin on "Opportunities for Social Scientists."

SECTION ON ENGINEERING (M)

(From report by W. R. Woolrich)

The section held two sessions on December 31 at which 6 papers were presented and a luncheon at which Everette DeGolyer delivered an address on "The Oil Reserves of Iraq and Iran." At the first session, at which W. R. Woolrich presided, the papers presented were on "The Philosophy of Engineering Education," by R. L. Sackett (read by the chairman), "The Role of Strategic Material in Our National Defense," by John R. Suman, and "Aeronautical Engineering—its Today and Tomorrow," by M. J. Thompson. At the afternoon session, D. C. Proctor presented a paper on "Industry in the Present Emergency," Ross White, one on "Modern Construction of Large Dams," and James M. Ketch, one on "Research in Electrical Engineering."

SECTION ON MEDICAL SCIENCES (N)

(From reports by Malcolm H. Soule)

Section N held 4 sessions with programs on the mornings and afternoons of Tuesday and Wednesday, at which 33 papers were presented. Of these papers, 20 were by special invitation and formed a symposium on "Relapsing Fever." The remaining 13 titles were unusually interesting contributions on various branches of medical science, including cardiology, endocrinology, biochemistry and bacteriology.

The symposium, the first on relapsing fever in the history of medicine, treated this malady as it exists in the United States and Central America. The first paper was a biography of Otto Obermeier, concerning

whose life little is known, by Konrad Birkhaug of Bergen, Norway. Obermeier discovered a tiny microorganism in the blood of patients with relapsing fever during the Berlin epidemic of 1867. However, the epidemic passed before he was able to establish firmly his conclusions and he was forced to wait 5 years for another epidemic to make available the necessary clinical material. Even though the evidence was ample, scientists were not prepared to accept a germ as an agent of disease. Obermeier died of cholera at the age of 30. It was his misfortune that his discovery became temporarily obscured by the triumphant bacteriological work of Robert Koch, a colleague, and Pasteur. Nevertheless, the finding of *Spirochaeta Obermeieri* emerges from that glorious epoch as a distinctive contribution to medical progress.

The tribute to Obermeier was followed by a series of papers which covered the distribution of relapsing fever in Texas, Oklahoma, California and Panama. Unquestionably one of the most important conclusions gained from these studies was the firm conviction that this disease has no geographical limitations. It may be present wherever there are infected ticks. Several papers followed on tick vectors and the life of the microorganism in infected ticks. Under laboratory conditions infected ticks have been maintained viable in a fasting state for 11 years and there is no reason to believe this interval marks the limits of their longevity. Thus an explanation is available for outbreaks of relapsing fever in association with caves and houses over long periods of time. The final group of papers of the symposium was devoted to the poorly understood phases of the life cycle of the spirochetes, its effect on the human host, the diagnosis of the disease and its importance as a public health problem. The European disease studied by Obermeier is louse-borne and in times of strife, such as the present, may cause great suffering and death wherever humans are concentrated under somewhat primitive conditions. In the western hemisphere the disease is tick-borne and, while markedly debilitating, it rarely causes death in the well-nourished human host. Those charged with the care of the health of our armed forces will certainly be pleased that it is expected that the symposium papers will be published by the association and give the latest and best information about this malady.

On Tuesday afternoon E. W. Goodpasture delivered his vice-presidential address before a general session on "Intracellular Parasitism in Human Infectious Diseases." Particular attention was focussed on intercellular parasitism in Rickettsial, Bartonella, bacterial, yeast, protozoan and virus diseases of man in which intracellular parasitism is either obligative or facultative. Certain implications of the cell-parasite

relationship were discussed with reference to pathogenesis, immunity and chemotherapy. Attendance at each session, about 55.

SUBSECTION ON DENTISTRY (Nd)

(From report by Paul C. Kitchin)

With the exception of a few miscellaneous papers, the entire three-session program of the subsection consisted of papers on "Public Health Aspects of Dentistry with Special Reference to Fluorine." Almost every research worker who has had a leading part in the investigation of fluorine relations to dental conditions took an active part in this symposium.

Fluorine has been definitely proved to be responsible for the dental condition variously known as "Brown Spots," "Colorado Brown Stain," "Mottled Enamel" and "Dental Fluorosis." This tooth enamel malformation, subsequently stained through other agencies, is due to the ingestion, during the first 8 years of life, of water containing fluorides. Amounts of fluorides in excess of two parts per million of water are capable of causing visible effects on the forming teeth.

Mottled enamel was first recognized and made a subject of study by F. S. McKay beginning in 1903. In 1916, in conjunction with G. V. Black, he published his first paper on the subject, establishing its limited geographical distribution. Until 1930 no cause for the mottled enamel had been found. Then H. V. Churchill, chief chemist of the Aluminum Company of America, using the better methods of water analysis that had been developed, established beyond question the presence of fluorine in water supplies of numerous areas of endemic mottled enamel and its absence where no mottled enamel occurred. Animal experimentation confirmed the conclusion that mottled enamel is produced by fluorides in the water used.

Thus far, as was pointed out, fluorine had been known to play only a destructive role. Within recent years evidence has been accumulating to indicate that its presence in water in small and optimal amounts seems to reduce materially the occurrence of dental decay. Although the mode of action is not yet known, the enamel of teeth resistant to dental decay has been shown to contain significantly greater amounts of fluorine than is present in those which are susceptible to dental decay. It is expected that this authoritative survey of an important public health problem will be published as a monograph by the association.

SUBSECTION ON PHARMACY (Np)

(From report by Glenn L. Jenkins)

Subsection Np held two sessions on December 29 at which 9 papers were presented, including a report by

Donald Slaughter on "Prostigmine Potentiates and the Hypnotic and Analgesic Action of the Barbiturates"; the results of a study by Loyd E. Harris on Petro wax and a report by him that Ephedra Nendensis Wats. growing in southwestern Oklahoma contains no ephedrine; the results obtained by C. H. Walden and G. L. Jenkins in their study on *Hermidium Alipes*, S. Wats., which proved that this drug contains a substance that increases blood pressure in a manner qualitatively and quantitatively similar to that of epinephrine; and a paper by T. C. Barnes on the electrical potential of frog skin in which he showed that the oxygen consumption is decreased about 40 per cent. by 1 per cent. sulfanilamide and that the excised auricles of the turtle are stimulated.

SECTION ON AGRICULTURE (O) AND AFFILIATED SOCIETIES

(From reports by M. F. Morgan, H. B. Tukey and F. M. Blodgett)

Section O (M. F. Morgan, *secretary*) held a joint session with the American Society for Horticultural Science, at which W. H. Chandler, retiring vice president and chairman for the section, presented a critical review of the changing pattern of agricultural science during the present century. The various roles of the experiment stations in developing scientific principles fundamental to the art of agriculture, of the agricultural colleges in training for service, of the extension organizations in the spread of helpful knowledge and of the governmental action agencies in promoting desirable farm practices were sharply portrayed. The need for more thorough training of agricultural students in the basic sciences, for a clearer understanding of the distinction between the art of farming, as best gained on the farm, and the scientific facts that can be imparted through agricultural training in secondary schools and for closer integration of the federal action agencies with the adult education program of the extension services were frankly discussed. The session also included a group of papers giving special attention to the development of floral primordia and the conditions essential to gametic union in relation to horticultural crops. Blossom induction was shown to be initiated at much earlier periods than was formerly believed. The environmental conditions at this stage exert profound influences upon such disorders as biennial bearing in apples and bud abscission in solonaceous plants. Attendance, about 175.

The American Society for Horticultural Science (H. B. Tukey, *secretary*) held its 38th annual meeting in 13 sections on the campus of Southern Methodist University. The number of papers and the number and nature of the sectional sessions showed the general tenor of scientific research and thought in horti-

culture throughout the country. There were sections on breeding and varieties of fruits, on nut crops, on nutrition and quality of vegetables, on growth and production of fruits, on breeding of vegetables, on problems in floriculture and ornamental horticulture, on propagation and developmental morphology of fruits and on culture and developmental morphology of vegetables. The rapid development of scientific horticulture in the South and the Southwest was shown by the large number of papers dealing with citrus fruits, tung, pecans, winter vegetables and the breeding of vegetable crops, fruit and nut crops and ornamental and floricultural crops. Round-table discussions were held on educational methods, on nomenclature and varieties and on experimental design.

Again the interest of the society in related fields of scientific effort is shown by joint sessions with the Potato Association of America on "Potato Problems"; with the American Society of Plant Physiologists and Physiology Section of the Botanical Society of America on "Experimental Design and Control and Measurement of Variation in Physiological Research"; and with the Biometric Section of the American Statistical Association on "Efficiency in Recent Methods for Controlling Field Heterogeneity."

The Potato Association of America (F. M. Blodgett, reporting) held its 28th annual meeting Dec. 29-31, 1941. The meeting was featured by three symposia, one on the value of southern seed testing trials, a second on new developments in certifying seed potatoes and a third on the bacterial ring rot disease. It was the belief of those present that the bacterial ring rot problem is being satisfactorily solved in most areas through the use of clean seed coupled with suitable sanitary precautions.

F. J. Stevenson, of the U. S. Department of Agriculture, was elected president for 1942.

SECTION ON EDUCATION (Q)

(From report by H. H. Remmers)

Section Q held 4 sessions at which 21 papers were presented, a panel discussion by 5 participants, a joint session with the Section on Psychology at which 6 papers were presented and a joint dinner with the Section on Psychology, at which the retiring vice presidents for the sections delivered their addresses.

The general theme for the section was conservation of resources, material and human. Most of the papers naturally considered regional problems of the South—the decline of illiteracy, soil depletion and the popularization of teaching conservation in the public schools. The final session dealt particularly with human resources in rural areas. A half-day session devoted to relatively technical papers deviated some-

what from the direct emphasis on conservation. In this session reports on responses of Negro children to the revised Stanford Binet Intelligence Test, the relation of peripheral perception in reading, potential contribution to English vocabulary of high-school Latin, French and Spanish and a study of students' judgment of their own quality of work were among the more technical papers. The development of an individualized program of science instruction was presented by P. N. Powers and W. C. Van Deventer, who outlined techniques for handling relatively large numbers of students with due respect to their individual differences. An experimental demonstration over a three-year period of the possibility of salvaging considerable numbers of potential failures in freshman mathematics at Purdue University was presented by D. R. Shreve.

The joint session with the Section on Psychology was devoted to a symposium on "The Psychology of Learning and the Educative Process." Those invited to participate in the symposium presented a notable program. Both explicitly and implicitly the thesis that the problems of psychology and of education are ultimately the same was ably supported. A particularly significant research was that of the effect of diet on learning by Harold F. Clark and M. F. Seay, who reported on some of the major effects of an experiment being carried on in 29 communities throughout the United States with startling increases in the rate of learning through improved diet and more effective learning materials. The relative effects of these two factors will, under the experimental design, be isolable when the experiments are completed.

At the joint dinner of Sections I and Q the retiring vice president for Section Q, E. J. Ashbaugh, ably reviewed the difficulties of a child who has to learn to read English. The title of his address was "Education as Science and Art." The retiring vice president for Section I, Karl M. Dallenbach, presented a most scholarly historical and experimental review of the temperature senses in a paper entitled, "The Temperature Senses: Their History and Present Status."

THE SOCIETY OF SIGMA XI

(From report by George A. Baitzell)

The 42nd annual convention of the Society of the Sigma Xi met at 4 P.M. Tuesday, with 49 chapters and 14 clubs represented by delegations of one to three members.

Charters for chapters of Sigma Xi were granted to the University of Hawaii, Illinois Institute of Technology, Louisiana State College and Utah State Agricultural College.

The Committee on Lectureships reported a series of five lectures, with engagements at 68 institutions.

The 20th annual Sigma Xi lecture, under the joint auspices of the A.A.A.S. and Sigma Xi, was given in the McFarlin Auditorium on the Southern Methodist University campus by Dr. Edwin P. Hubble, of Mt. Wilson Observatory, on the subject "The Expanding Universe Theory."

Officers were elected as follows: *President*, Ross A. Gortner; *member of executive committee for 5-year term*, Fernandus Payne; *member of the alumni committee for 5-year term*, Paul R. Heyl.

UNITED CHAPTERS OF PHI BETA KAPPA

Dean Christian Gauss, of Princeton University, delivered the seventh annual lecture presented at annual meetings under the auspices of the society and the association on "Can We Educate for Democracy." Both the subject and the treatment of it reflected the searching examination of fundamentals respecting the organization of society that is being made today.

THE AMERICAN SCIENCE TEACHERS ASSOCIATION

The society held two sessions and a luncheon, at which Dr. Irving Langmuir, president of the A.A.A.S., delivered an address. At the first session, held jointly with the American Nature Study Society, 4 papers were presented on various aspects of nature study. The second session, also held jointly with the American Nature Study Society, was devoted to a symposium on "Science in the Service of Youth in a Democracy," following which the prize-winning papers of the junior academy of science in Texas were announced.

THE AMERICAN NATURE STUDY SOCIETY

In addition to the two joint sessions with the American Science Teachers Association, the society held one session on December 31 for the presentation of 4 papers and a session for sound motion pictures of snapping turtles and sunfish, and phonograph records of bird songs, both presented by E. Laurence Palmer.

HONOR SOCIETY OF PHI KAPPA PHI

Homer P. Rainey, president of the University of Texas, delivered the third annual lecture on "Scholarship is not Enough." In addition, the society held a breakfast and business session on December 31.

SIGMA DELTA EPSILON, GRADUATE WOMEN'S SCIENTIFIC FRATERNITY

The society held a luncheon on December 30 at which Ercel Eppright, director of home economics at Texas State College for Women, delivered an address on "Texas Foods, Yesterday and Today." In addition the society held a breakfast and business session.

TEXAS ACADEMY OF SCIENCE

The Division of Geological Sciences (C. L. Baker,

vice president) held two joint sessions with the Section on Geology and Geography (E) and the Geological Society of America on December 29, at which 17 papers were presented (report of Section E). The Division of Social Sciences (T. H. Etheridge, *vice president*) held a joint session on December 29 with the Section on Social and Economic Sciences (K), at which 3 papers were presented (report of Section K). The Collegiate Division (J. C. Godby, *chairman*) held sessions on December 29, at which 9 papers were presented. The Junior Division (Emily Barry Walker, *chairman*) held a morning session on December 31 on problems relating to junior academies and science clubs. The afternoon was devoted to the final contest of the Chicago apparatus award.

MINUTES OF THE MEETING OF THE COUNCIL

(From report by Otis W. Caldwell, secretary)

1. The American Society for X-ray and Electron Diffraction and the American Association of Cereal Chemists were accepted as affiliated societies; the Wilderness Society was accepted as an associated society.

2. The election of members to fellowship were distributed among the sections as follows: B, 1; F, 4; G, 9; H, 1; I, 42; L, 2; N, 1; Nd, 3.

3. The names of officers elected were published in SCIENCE, January 9, 1942, pages 39 and 40.

4. The following members were elected "emeritus life members" under the provisions of the Jane M. Smith Fund: B. M. Duggar, Alexander W. Evans, Peter Fireman, William McPherson, Karl M. Wiegand and Charles B. Davenport.

5. The following were elected "emeritus annual members" under the Luella A. Owen Fund for the fiscal year ending September 30, 1942: Clarence P. Gillette, Frederick J. Wulling, James C. Graham, Samuel M. Lindsay, Elmer O. Wooton, Morton J. Elrod, Frederick C. Waite and Milton Bennion.

6. Approval was given to the following places and dates for holding annual meetings, provided general conditions are not such that the meetings would be inadvisable:

| City | Date |
|----------------------|---------------------------------|
| Ann Arbor, Mich. | June 22-26, 1942. |
| New York, N. Y. | Dec. 28, 1942, to Jan. 2, 1943. |
| Cleveland, Ohio | Dec. 27, 1943, to Jan. 1, 1944. |
| Atlantic City, N. J. | Dec. 27, 1944, to Jan. 2, 1945. |

7. The following summary report covering membership was presented by the Permanent Secretary:

| | 1937 | 1938 | 1939 | 1940 | 1941 |
|------------------------------|--------|--------|--------|--------|--------|
| Membership (Dec. 20) | 18,777 | 20,050 | 20,366 | 21,050 | 23,123 |
| Paid members (Dec. 20) | 13,145 | 14,694 | 14,781 | 15,367 | 16,989 |
| One year arrears | | | | | |

| | | | | | |
|--------------------------------------------|-------|-------|-------|-------|-------|
| (Dec. 20) | 4,968 | 4,674 | 4,861 | 4,983 | 5,257 |
| Two year arrears (Dec. 20) | 664 | 682 | 724 | 700 | 896 |
| Resignations and deaths (Dec. 20) | 245 | 288 | 278 | 274 | 313 |
| Reinstatements (Oct. 1-Dec. 20) | 28 | 18 | 18 | 13 | 18 |
| New members (Oct. 1-Dec. 20) | 1,181 | 1,500 | 903 | 729 | 2,169 |

(On January 15, 1942, the total enrolment was 23,701. Between October 1, 1941, and January 15, 1942, 2,748 new members were added to the membership roll.)

8. The following financial reports are summarized from audited statements which were accepted by the Council:

FINANCIAL REPORTS

TREASURER'S REPORT

Balance Sheet—Assets at September 30, 1941

| | |
|--------------------------------|--------------|
| Securities and mortgages | \$152,819.77 |
| Cash awaiting investment | 120,149.91 |
| Cash for current needs | 15,869.31 |
| Total assets | \$288,838.99 |

Balance Sheet—Liabilities at September 30, 1941

| | |
|------------------------------------------------------|--------------|
| Endowment—for research (1) | \$117,911.45 |
| Endowment—for general purposes (2) | 92,197.88 |
| Endowment—dues for emeritus life members (3) | 5,000.00 |
| Endowment—dues for emeritus annual members (4) | 500.00 |
| Reserve fund | 44,022.19 |
| Permanent Secretary's fund | 13,338.16 |
| Prize fund | 2,000.00 |
| Grants to affiliated academies | 560.00 |
| Accumulated income for appropriation in 1942 .. | 13,309.31 |
| Total liabilities | \$288,838.99 |

(1) Richard T. Colburn fund, \$87,186.45; fees of deceased sustaining members, \$7,000; fees of deceased life members, \$20,200; A. G. Stillhamer fund, \$3,525.

(2) W. Hudson Stephens fund, \$4,381.21; Michael P. Rich fund, \$10,000; Hector E. Maiben fund, \$27,357.67; Friends of the Association fund, \$3,559; Jennie M. Arms-Sheldon fund, \$1,000; fees of living life members, \$45,900.

(3) Jane M. Smith fund, \$5,000.

(4) Luella A. Owen fund, \$500.

CASH STATEMENT

Receipts

| | |
|------------------------------------------------|--------------|
| Balance, September 30, 1940 | \$ 60,963.43 |
| Life membership fees | 1,300.00 |
| Grant returned and miscellaneous refunds | 235.00 |
| Contribution to Prize Fund | 1,000.00 |
| Sale and redemption of securities | 124,677.92 |
| Interest accumulated during fiscal year | 8,865.86 |
| Total receipts | \$197,042.21 |

Disbursements

| | |
|-------------------------------------------------|--------------|
| Securities purchased | \$ 52,919.04 |
| Grants-in-aid of research | 2,121.45 |
| Grants to affiliated academies | 2,625.00 |
| For new emeritus life members | 600.00 |
| For emeritus annual members | 21.50 |
| Life members' journal subscriptions | 1,614.00 |
| Fifty-year members' journal subscriptions | 78.00 |
| Thousand Dollar annual prize | 1,000.00 |
| Miscellaneous expenses | 44.00 |
| Total disbursements | \$ 61,022.99 |
| Cash on hand, September 30, 1941 | 136,019.22 |
| | \$197,042.21 |

PERMANENT SECRETARY'S REPORT

Balance Sheet—Assets at September 30, 1941

| | |
|------------------------------------|--------------|
| Cash in banks | \$ 19,989.08 |
| Reserve in Treasurer's hands | 13,338.16 |
| Accounts receivable | 378.54 |
| Supplies on hand | 1,811.26 |
| Deferred charges | 4,550.34 |
| Total assets | \$ 40,067.38 |

Balance Sheet—Liabilities at September 30, 1941

| | |
|-------------------------------------|-------------|
| Advance payments of dues, etc. | \$ 1,070.85 |
| Special committee funds: | |
| Place of Science in Education | 308.53 |

| | |
|-------------------------------------------|--------------|
| Popular Science Reading Lists | 206.35 |
| Permanent Secretary's cash reserves | 32,812.36 |
| Balancing account | 5,669.29 |
| Total liabilities | \$ 40,067.38 |

INCOME STATEMENT

for the Fiscal Year Ended September 30, 1941

Income

| | |
|----------------------------------------------|--------------|
| Annual dues and fees | \$ 99,823.84 |
| Interest on bank accounts | 616.76 |
| Miscellaneous receipts | 1,714.25 |
| Registration fees—Philadelphia meeting | 3,154.00 |
| Registration fees—Durham meeting | 322.00 |
| Receipts from Philadelphia Exhibition | 7,411.00 |
| | \$113,041.85 |

Expenses

| | |
|------------------------------------------------------------|--------------|
| Subscriptions to journals, including foreign postage | \$ 61,651.59 |
| Expenses of Washington office | 24,014.60 |
| Expenses of General Secretary | 510.33 |
| Allowances to Pacific and Southwestern Divisions | 2,566.00 |
| Circularizing for new members | 3,368.56 |
| Miscellaneous expenses | 689.53 |
| Expenses of Philadelphia Exhibition | 3,965.21 |
| General and travel expenses—Philadelphia meeting | 4,942.00 |
| General and travel expenses—Durham meeting .. | 802.19 |
| General and travel expenses—Chicago meeting .. | 391.96 |
| | \$102,901.97 |
| Balance | 10,139.88 |
| | \$113,041.85 |

REPORT OF THE COMMITTEE ON GRANTS

Upon recommendation of the Committee on Grants, consisting of Drs. S. A. Mitchell, *chairman*, J. T. Buchholz, Henry Crew, Vincent du Vigneaud, T. R. Hogness, W. S. Hunter, G. H. Parker and A. H. Schultz, the council of the association awarded grants-in-aid amounting to \$1,791.89 as follows:

Helen Purdy Beale, for a study of the photoelectric titration of plant viruses, \$125.

Arthur N. Bragg, for a study of the ecological factors and habits limiting distribution of Anuran Amphibians together with a study of Isolating Mechanisms, particularly at times of breeding, \$116.89.

E. P. Mumford and G. D. Hale Carpenter, for a study of faunal distribution with particular reference to oceanic islands, \$100.

Ernst Caspari, for a study of the inheritance and gene physiology of testis coloration in *Ephesia kutmiella* Z., \$125.

E. R. Eller, for an investigation of the scolecodont fauna and stratigraphic interpretation of the Trenton Limestone of Ontario, New York and Pennsylvania, \$300.

Lillian N. Ellis, for a study of the mechanism of the sparing action of Riboflavin on Thiamin, \$150.

Douglas G. Ellson, for a study of the relationship between available measures of auditory acuity and an intensity threshold for the perception of speech in context, \$300.

Martin A. Entin, for an investigation of cell physiology of mammalian carcinoma and studies of living cells using tissue culture technique, \$150.

John P. Foley, Jr., and Charles N. Cofer, for a study of certain problems in the application of conditioned response principles (mediated generalization) to verbal behavior, \$325.

Eric Ponder, for a study of the action of capillary poisons, \$100.

SCIENCE EXHIBITION

Agricultural and Mechanical College of Texas: (1) Division of Swine Husbandry, (2) Division of Animal Husbandry, (3) Division of Agronomy, (4) Division of Plant Pathology and Physiology, (5) School of Engineering and Department of Physics; American Association of Petroleum Geologists; American Association of Scientific Workers; Bausch and Lomb Optical Co., Rochester, N. Y.; Biological Abstracts, University of Pennsylvania; The Blakiston Co., Philadelphia, Pa.; Central Scientific Co., Chicago, Ill.; The Dallas Petroleum Geologists; The Eastman Kodak Co., Rochester, N. Y.; The General Electric Co., Schenectady, N. Y.; The Gradwohl School of Laboratory Technique, St. Louis, Mo.; The Linguaphone Institute, N. Y.; Kansas Agricultural Experiment Station; The Macmillan Co., New York; McGraw-Hill Book Co., New York; Metric Association; National Geographic Society, Washington, D. C.; North Texas Biological Society; North Texas State Teachers College, Department of Chemistry; University of Oklahoma, Department of Botany; Prentice-Hall, Inc., New York; W. B. Saunders Co., Philadelphia, Pa.; Science Clubs of America; The Science Library; The University Presses, A Cooperative Exhibit; The South-Western Biological Supply Co., Dallas, Texas; Spencer Lens Co., Buffalo, N. Y.; Texas Power and Light Co., Dallas, Texas; John Wiley & Sons, Inc., New York; The University of Texas, Austin, Texas; The University of Texas, Department of Physiology; Tulane University of Louisiana, Department of Tropical Medicine; RCA Manufacturing Co.

In the report sent to the daily press by Science Service it is remarked that progress of science during 1941, despite threats of war and final sudden outburst of war itself, was strikingly set forth in the annual exhibition of the American Association for the Advancement of Science, shown in connection with the Dallas meeting. Many universities, research institutions and industrial firms cooperate annually in this display of the latest results of research.

Oil, indispensable alike in war and peace, is one of the chief products of the region where this year's meeting was held, so that a demonstration of modern scientific oil prospecting methods, by the American Association of Petroleum Geologists, fittingly occupied a prominent place in the exhibits. By models and charts it demonstrated how geologists feel their way through hundreds of feet of solid rock and shifting sand, to where the oil is.

How science also aids in providing more and better food and clothing, to meet the increased needs of war and the post-war world, was demonstrated in several booths set up by the Texas Agricultural and Mechanical College. Colechicine, the evolution-speeding chemical, has been applied to the cotton plant, to make it

produce bigger bolls and oilier seeds. Some of the husky new cotton plants were exhibited, growing in pots, contrasting with their punier untreated relatives that stand beside them. Science helps cotton below ground as well as above; another part of the exhibit demonstrated advances in combatting the fungus-caused root rot, one of the worst of cotton diseases.

Dissemination of scientific knowledge, as well as its increase through research, claimed its share of attention. A recently formed organization of professional scientists, the American Association of Scientific Workers, devoted its exhibit to a demonstration of its work in aiding defense, morale and national health; preserving science and freedom of thought in war time; educating the scientists themselves in problems that involve social welfare.

A booth was maintained by *Biological Abstracts*. Scanning and boiling down to a few sentences each the technical articles in more than 1,400 scientific journals, this publication saves the time of busy research workers.

Science is not exclusively an affair for professionals. That the tradition of the serious amateur, established in America by Franklin and Jefferson, Rittenhouse and Priestley, still carries on valiantly was evidenced by the exhibit of the Science Clubs of America. This is a national organization of hundreds of school and adult clubs composed of persons young and old who devote their spare time to scientific pursuits, ranging all the way from the study of the ways of frogs and field-mice to the making of telescopes and their use in discovering comets and watching variable stars. Science Service, which serves as liaison agency for these clubs, displayed some of its publications and the monthly specimen-service known as *Things of Science*.

BOOKS RECEIVED

- Advances in Colloid Science*. ELMER O. KRAEMER, editor. Volume I. 161 Illustrations. Pp. xii + 432. Interscience. \$3.00.
- Four Treatises by Paracelsus*. HENRY E. SIGERIST, editor. Translated from the German by Sigerist and Others. Pp. xii + 256. Johns Hopkins Press. \$3.00.
- COLEMAN, LAURENCE VAIL. *College and University Museums*. Illustrated. Pp. viii + 73. American Association of Museums. \$1.25.
- LEYSON, BURR. *It Works Like This*. Illustrated. Pp. 224. E. P. Dutton. \$2.50.
- MARKHAM, EDWIN C. and SHERMAN SMITH. *General Chemistry Problems*. Pp. 240. Reynal and Hitchcock. \$1.25.
- MERRIMAN, GAYLORD M. *To Discover Mathematics*. Pp. xi + 435. Wiley. \$3.00.
- Papers on Mammalogy*. Published in honor of Wilfred Hudson Osgood. Volume 27, Field Museum of Natural History Zoological Series. 12 Plates. Pp. 395. Field Museum. \$3.00.
- ROEBUCK, JOHN R. and HENRY C. STAEBLE. *Photography, Its Science and Practice*. Illustrated. Pp. xv + 283. D. Appleton-Century. \$5.00.
- UNGER, W. BYERS and C. E. MORITZ. *A Laboratory Manual for Elementary Zoology*. Pp. iv + 102. Ginn. \$1.25.

MICRORADIOGRAPHY

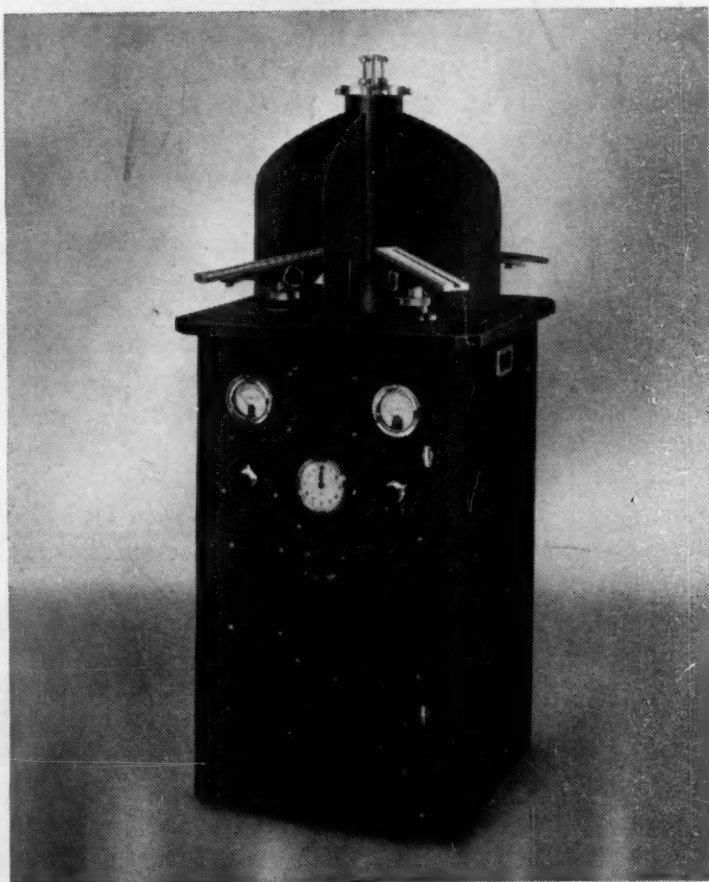
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SCIENCE NEWS

Science Service, Washington, D. C.

SOME PAPERS READ BEFORE THE DALLAS MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE AND ASSOCIATED SOCIETIES

Totalitarian governments fight against nature itself when they try to make every one alike, was pointed out by Dr. A. F. Blakeslee, president of the American Association for the Advancement of Science, in the principal address at the Dallas meeting. He said: "Opposition to totalitarianism is not merely because it attacks man's rights but also because it suppresses his personality. Individuality is the kernel of democracy, the biological basis of the struggle for freedom. When we fight for individuality we fight on the side of nature." In support of his thesis, the speaker cited many examples of unpredictable individual differences among superficially similar persons—differences reaching even to such things as inability of some to taste or smell substances that are extremely disagreeable to others. Everywhere in nature, individual differences are the universal rule. "Like as two peas" is not only trite but untrue: it should run, "Unlike as two peas." Dr. Blakeslee also defended science against the charge of ruining the world through helping to make war more deadly and destructive. Admitting that some of the contributions of science have been perverted by evil men to evil uses, he believes that this is more than offset by the life-saving functions of science even in war. "Deaths due to battle injuries increased from 15 per thousand for the Mexican War through 33 for the Civil War to 53 for the first World War," he stated. "The death rate due to disease, however, decreased from 110 through 65 to 19 for the World War. The result is that the total death rate declined from 125 in the Mexican War through 98 in the Civil War to 72 per thousand in the World War. It is a satisfaction to feel that though implements of war have increased in destructiveness, those who are fighting to preserve our free way of life may not be subjected to greater risks than our forefathers assumed when they too fought for their country."

Dr. Edwin P. Hubble, of the Mount Wilson Observatory, pointed out in the annual Sigma Xi lecture that the universe that will open up before the giant eye of the 200-inch Mount Palomar telescope, when it goes into action a few years hence, may turn out to be "small," in the sense of being finite. The finiteness of the universe, if it is established, will be a consequence of the curvature of space, as conceived in the relativity theory. This theory envisions space as being warped or bent in the presence of large masses of matter; the larger the mass the greater the bending. To make such a universe fit certain observed facts within the reach of present-day telescopes, it is necessary to assume so great a degree of curvature that as much as a fourth of the total volume may even now be within telescopic range. However, an opposite interpretation may be placed on the observed phenomena that have led mathematicians and astronomers to speak of curved space and a closed or finite universe. The so-called red shift—the progressive reddening of light

from stars rapidly speeding away from us—would mean, in a "straight-line" way of looking at the cosmos, that the universe is actually infinite, and that the part of it we can see without telescopes is an exceedingly small fraction of the whole. "On the basis of the evidence now available," said Dr. Hubble in conclusion, "a choice seems to be presented, as once before in the days of Copernicus, between a small, finite universe, and a sensibly infinite universe plus a new principle of nature. And, as before, the choice may be determined by the attribute of simplicity."

Recent experiments on the scattering of electrons by light gases, hydrogen, helium and the lighter hydrocarbons, especially designed to decide between the classical mechanics and the new wave mechanics, resulted decidedly in favor of the latter, according to Dr. A. L. Hughes, retiring vice-president of the section on physics. In one particular case, the wave mechanics predicted just half the scattering given by classical formulas. Experiment showed the wave mechanics was right. The scattering of electrons was also found to be identical with the scattering of x-rays under similar circumstances. The classical mechanics assumes that forces in the atomic world obey the laws laid down by Newton, which do work well for larger masses. Wave mechanics assumes that with every electron is associated a wave, and this "wave function" modifies its behavior in ways that can be calculated by the theory.

Viewing invisible particles as huge, rugged, three-dimensional chunks that "stuck out" from the projection-lantern screen, an audience of physicists sat in something like schoolboy awe, while Dr. V. K. Zworykin and Dr. J. Hillier, of the RCA Research Laboratories, explained this latest wonder of the electron microscope. The electron microscope, now becoming well known for its capacity to make visible on a large scale details too fine to be detected at all with light-using instruments, produces its images by means of magnetically focussed streams of atomic particles. Hitherto it has been used only to take pictures from a single "shooting angle," so that its micrographs were like single, "flat" photographs. The problem of making the instrument take stereoscopic pictures, that is, shots from two slightly different angles, has been solved. The specimen holder is so built that it can be rotated through 180 degrees between exposures. The resulting photographs are then mounted so that they can be viewed through a stereoscope. Or, the twinned pictures can be made into a double lantern slide, viewed with special Polaroid goggles.

The "law of the jungle" does not apply to human relations, Professor Alfred E. Emerson, of the University of Chicago, stated in his address as president of the Eco-

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logical Society of America. The principle of cooperation is found working in all living organisms, he said, and is far more important in the evolution of human society than is the "struggle for existence" between human individuals or human groups. Over-emphasis upon the principle of natural selection proposed by Darwin and failure to keep abreast of later scientific concepts were held responsible for the persistence of this over-simplified, over-sanguinary outlook: "Darwin emphasized natural selection as the basic mechanism of evolution. To-day we feel that our knowledge of the genetics of variation and the rôle of isolation gives us a clearer picture of evolutionary dynamics. However, natural selection is still of tremendous importance, not so much as the prime factor in the origin of all species as it is the explanation of practically all complex adaptation."

Genes, that determine hereditary characters in human beings as well as in lower organisms, are coming to be better understood in our own race despite the difficulties of studying them, according to Professor Laurence H. Snyder, of the Ohio State University. Certain genes, especially those that produce physical defects and constitutional diseases, have been traced to the particular chromosomes that are their abiding-places, and in some instances even their particular locus on a chromosome has been determined. Most success has been achieved in the study of defects and other hereditary characters connected with the sex chromosomes. If a particular trait is inherited only by the sons in a given family line, the first place one would think of looking for it would be on the microscopic bit of protoplasm in the nucleus that determines that its possessor shall be a male. And very frequently such leads have led to positive results.

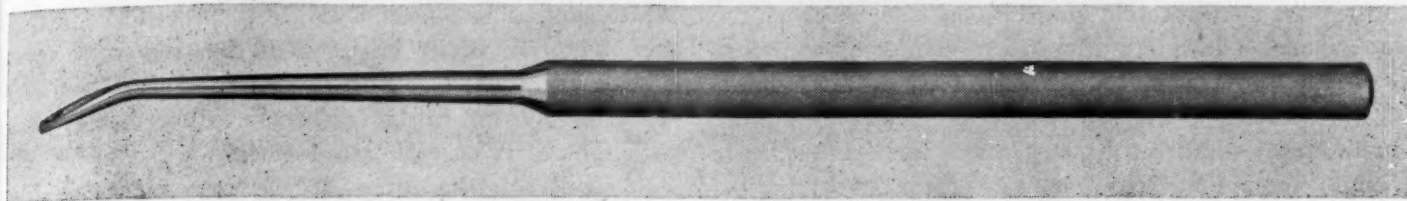
Evolutionary changes appear rapidly at high living temperatures, more slowly in chilly environments, according to experiments of Professor H. H. Plough and Dr. George P. Child, both of Amherst College, who discussed different aspects of this phenomenon. They used as experimental animals the little vinegar fly or pomace fly, *Drosophila*, partly because its small size and simple living requirements make it easy to rear huge numbers in limited space, partly because long study of this particular species has resulted in a better knowledge of its heredity than that of any other organism. Mutations, or abrupt evolutionary changes, appeared about five times more frequently among the offspring of a given number of animals in a "warm" colony than among the same number of offspring kept at a temperature ten degrees colder. It does not seem that high temperature in itself is the cause of mutations, since mutations appeared also among the insects kept at low temperature. More probable is the assumption that the natural tendency of all living things to change is intensified by the speeding-up of life processes that occurs when it is warmer.

Electricity's intimate tie-up with life itself is strikingly shown in experiments with apparatus displayed at the exhibit of the University of Texas. Research with this apparatus, so delicately adjusted that single cells of living

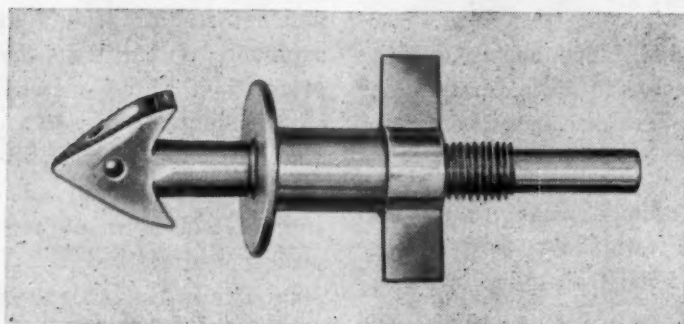
plants can be picked up and accurately manipulated, is being conducted by Dr. E. J. Lund and his associates. One of the devices picks up a single thread of a lower waterplant, or alga, and dips its end in a tiny cup of water. The exceedingly minute current of electricity which it generates as long as it is alive is recorded. The electrical potential is shown to be higher near the ends of the long cells and is at its highest in the region of the actively growing tip, where life is most intense. Another device shows how a small plant, when laid on its side, instantly becomes positively electric on its under side, negatively on its upper side. About half an hour later, the tip begins to bend upward at the point where the electrical difference developed. In a third piece of apparatus, tiny onions are grown in such a way that electric current flows downward along one set of roots, upward against a second set. The downward current has no effect on the rate of growth, but the upward current causes a slowing of growth in the roots that are pointed against its direction.

Through lowly bacteria that shine in the dark, new light has been shed on the old puzzle as to why certain substances "put you to sleep." Experiments bringing out new facts in the old problem of narcosis were reported before the meeting by Professor Frank H. Johnson, of Princeton University, and Professor Dugald E. S. Brown and Professor Douglas A. Marsland, both of New York University. Drugs like ether, chloroform, alcohol and novocaine caused bacterial luminescence to "go out like a light." If the vessels containing the bacteria were placed under pressure, however, the reaction was reversed and the bacteria lighted up again. Investigation of the chemistry of the reaction showed that the drugs produced their effect by combining with the enzyme that oxidizes the luminous compound of the cells, causing it to glow. Pressure "pried the drug loose" from the enzyme, permitting it to act again. This was proved by experiments in which no living bacteria were involved, but only the non-living compounds which had been extracted from the cells. This new theory of narcosis through drugs combining with an enzyme at least partly displaces the older theory still presented in most text-books, that narcotics act through combination with fatty material in cells.

Large-scale chemical analysis of the nucleoproteins, which might without exaggeration be called the essence of life itself, has been made possible through a simple method of extracting them from living cells with a strong salt solution, according to a report by Dr. A. W. Pollister and Dr. A. E. Mirsky, of Columbia University and the Hospital of the Rockefeller Institute for Medical Research, read at the meeting of the Genetics Society of America. Nucleoproteins are what the nuclei of cells are made of, and since nuclei are at once the directors of physiological activities of the cells and the containers of the genes that determine the course of heredity, the importance of a better knowledge of their chemistry is obvious. Until now, however, it has been extremely difficult to obtain sufficient quantities of these substances to make satisfactory analyses. Drs. Pollister and Mirsky stated:



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Electron photomicrographs of almost unimaginably thin linings of insect breathing-tubes were shown to the meeting by Dr. A. Glenn Richards, of the University of Pennsylvania, and Dr. Thomas F. Anderson, RCA Fellow of the National Research Council. Some of the details, invisible even with the highest powers of light-using microscopes, help to explain why certain insects are resistant to poison dusts and fumes while others are not. The photographs, made with streams of atomic particles instead of waves of light, show that although the uppermost layer of the cuticle lining a cockroach's breathing-tubes (which serve insects in place of lungs) is only 2.5 microns (one ten thousandth of an inch) in thickness, it is composed of two layers, the thinner of which has a thickness of the order of a hundredth of a micron.

Despise not the humble, homely toad. He may not be able to charm your ear like a hermit thrush, or please your eye like a bluebird, but he's more useful than either when it comes to destroying insect enemies. He's right down on the ground, where some of the wickedest insects are, and he's on the job in the dusky hours when songbirds are fast asleep. Before the meeting of the Ecological Society of America, Charles C. Smith, of Monroe, La., and Dr. Arthur N. Bragg, of the University of Oklahoma, reported their study of the highly beneficial food habits of several different species of toads. They have enormous appetites, though the time-honored notion that a toad must fill its stomach four times a day seems doubtful. Digestion, in fact, is rather slow. Favored foods include grasshoppers, chinchbugs, cutworms, leaf-beetles. Toads, it appears, are not specialists. Big toads go especially for big insects, little toads for little ones. But they're not fussy about kinds and varieties. Anything that crawls on multiple legs is fair game for a toad.

Masses of plant tissue, separated from the parent plant and growing in laboratory dishes of nutrient solution, are yielding answers to old puzzles about life processes that could not be learned from whole plants because they are too complex, Dr. Philip R. White, of the Rockefeller

Institute for Medical Research, stated in the Stephen Hales Prize address before the American Society of Plant Physiologists. The ideal goal of the tissue culturist, Dr. White said, is to obtain a single plant cell and make it live and grow all by itself. This has not yet been attained; the nearest scientists have come to it is the culturing of bits of fairly uniform, undifferentiated tissue, with thousands of cells all essentially alike. With such tissue cultures, the limits of the requirement of plant tissues for iron have already been determined. Any solution with a concentration of more than one part of iron to 50,000 of water is poison to the cells. Yet if the solution entirely lacks iron the tissue stops growing and will not resume growth until at least a trace of iron is supplied. Other tests have suggested that plant cells prefer to feed on sucrose (cane sugar) rather than the simpler sugar, glucose; a conclusion at variance with the statements in most text-books. Still further researches are being conducted on mineral requirements, vitamin, enzyme and hormone reactions, and other physiological problems simplified by the undifferentiated samples of plant life in the laboratory dishes.

If we of modern times could walk in a forest of 50 million years ago, we should see some very familiar-looking trees—redwoods, bald cypress, hickory, oak—even though the animals would look like nothing on earth today. Yet the forest would be a strange one for all that, was pointed out by Professor Ralph W. Chaney, of the University of California, because of the very mixture of trees just mentioned, plus some additional species now found only in eastern Asia, like the ginkgo tree. The forest—any forest—of the 50-million-years-ago Tertiary period was a grand mixture of trees now found only in widely separated parts of the earth. Thus, the redwoods are found only on the Pacific coast of North America, the ginkgo only in Asia, the combination of bald cypress, hickory and oak only in the southeastern United States. Many thousands of years of climatic changes, of slow rise of mountain masses, of thrusting of deserts and dry grasslands into the once continuous forest belt, have acted to bring about this separation and sifting of species.

A NEW science, paleogrostology, or the study of ancient grasses, was introduced, when Dr. Maxim K. Elias, of the University of Nebraska, presented the results of his long study of fossil seeds found in the same rock strata of the West that have yielded the bones of early forms of horses, camels and other herbivorous animals that lived on this continent in the Tertiary geologic period. Seeds proved the most dependable plant parts for identification of these ancient grasses. Earlier identifications of leaves and other vegetative parts have sometimes described as grasses plants that are not grasses at all. Examination of fossil grass seeds from successive strata of rocks yielded evidence that climates of the ancient West went through slow swings from dry to moist and back to dry again, many times. Interesting also is the change in the types of teeth in the jaws of herbivorous animals after the evolution of the grasses began.